FOUNDRY TRADE JOURNAL

EST. 1902

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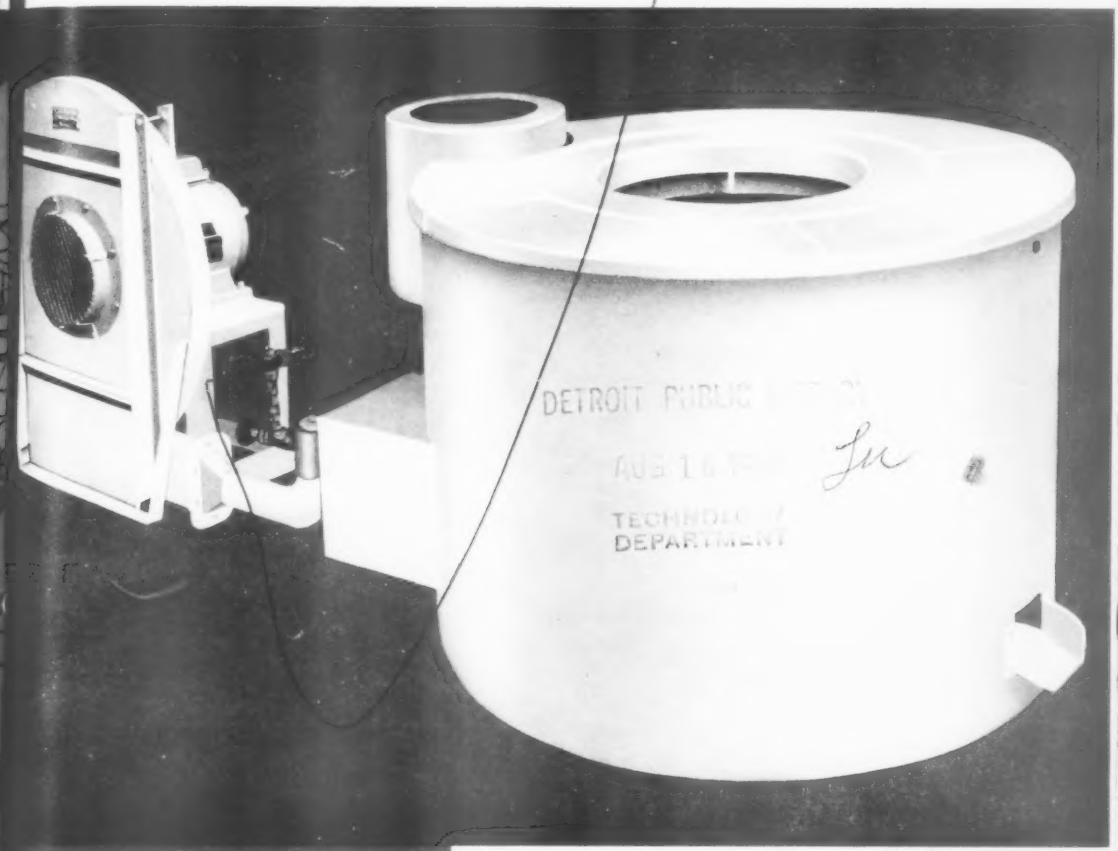

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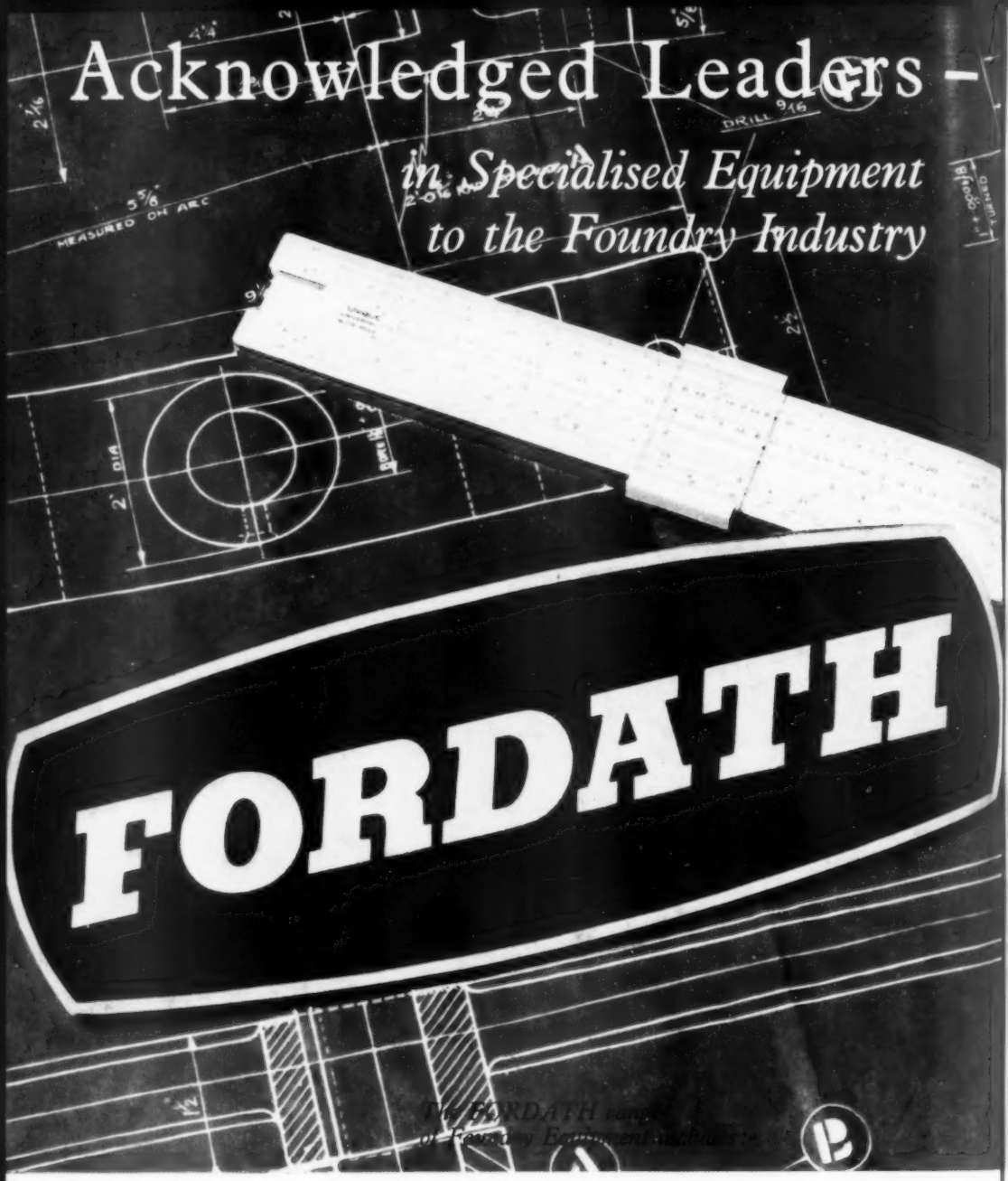

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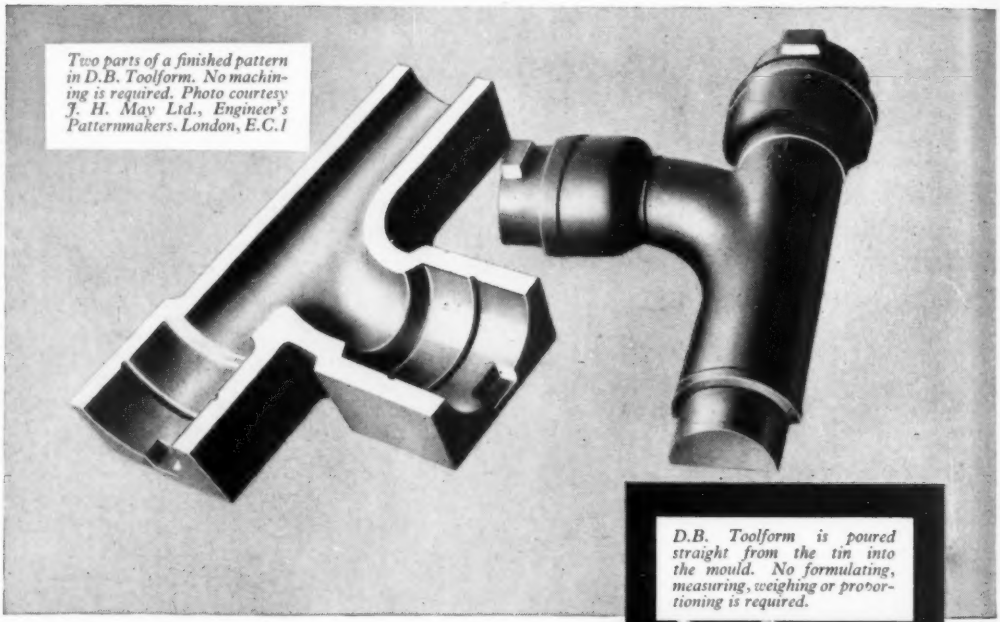

Two parts of a finished pattern in D.B. Toolform. No machining is required. Photo courtesy J. H. May Ltd., Engineer's Patternmakers. London, E.C.1

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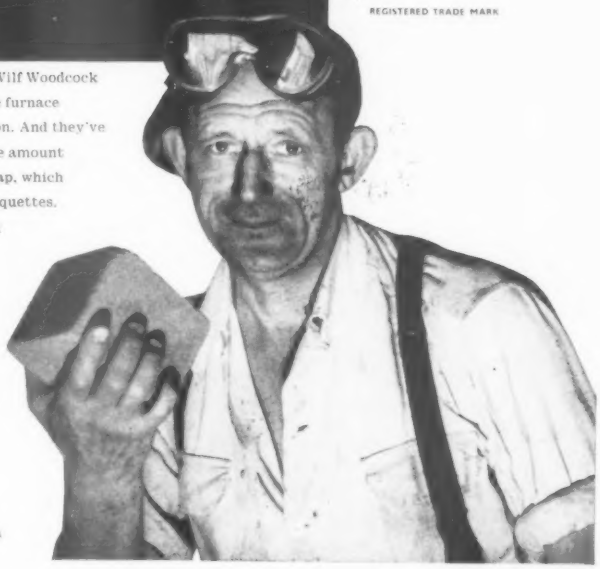

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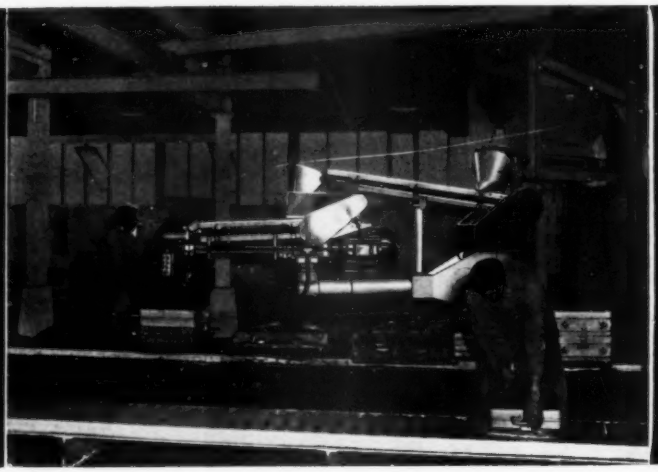

The above photograph, appearing by the kind permission of The Alliance Foundry Co. Ltd., of Luton, Beds., shows one of our Sand Projection Machines No. 6, which has been installed and is now operating in their Foundry.

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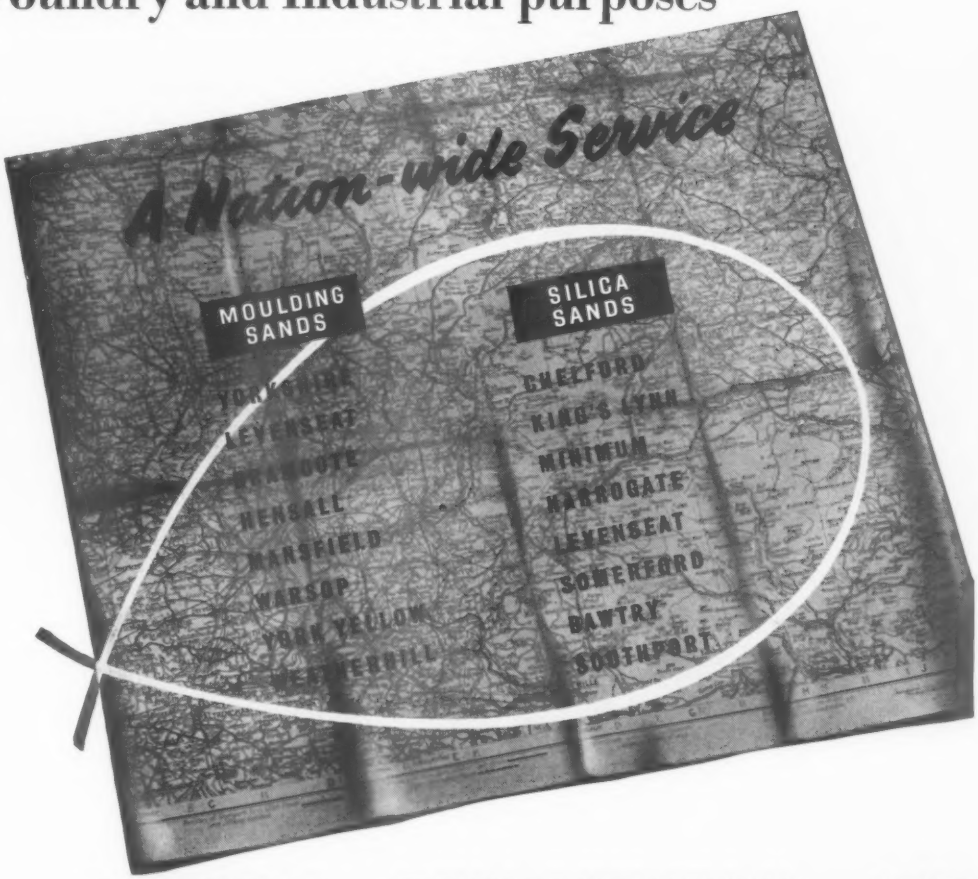

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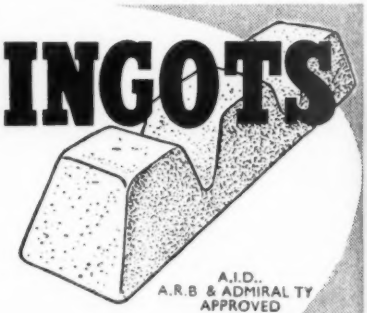

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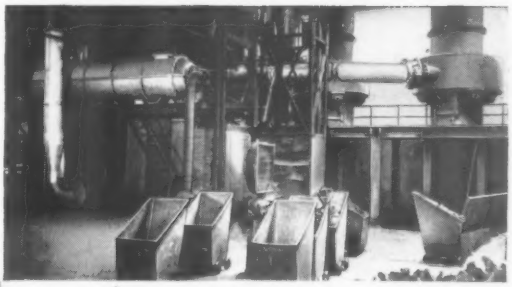
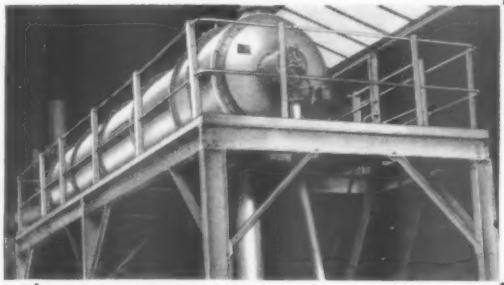
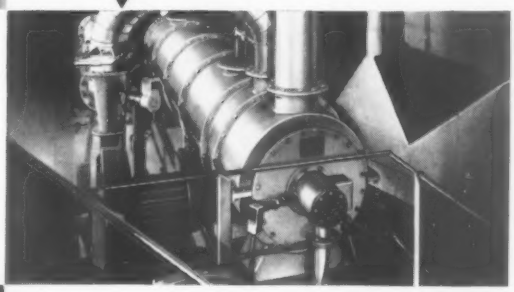


1 above Heater serving two 4-ton-per-hour cupolas producing blackheart malleable. Blast temperature 425°C.
(The Brockmoor Foundry Co. Ltd.)

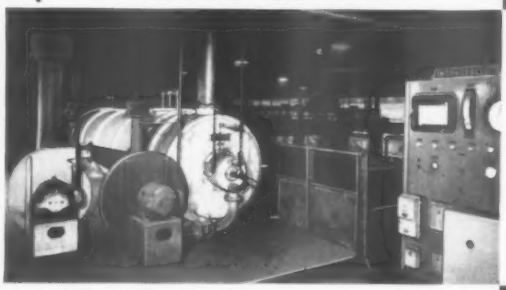


2 below A small blast heater connected to an unlined cupola with water-cooled shell. Blast temperature 300°C.

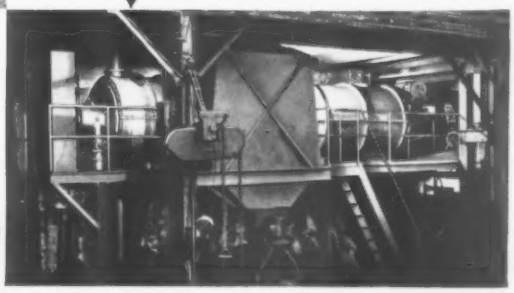
3 above This heater supplies hot blast to a pair of cupolas producing metal for air-cooled cylinder castings.
(Idoson Motor Cylinder Co. Ltd.)



4 below Hot blast for two 4-ton-per-hour cupolas is supplied by this heater which is rated to deliver 2,000 s.c.f.m. at 500°C.
(Sheepbridge Equipment Ltd.)



5 below When floor space is at a premium the heater can be arranged to take up very little room. This unit is mounted on a platform and supplies blast at 450-480°C to a pair of 7-ton-per-hour cupolas.
(The Dudley Foundry Co. Ltd.)



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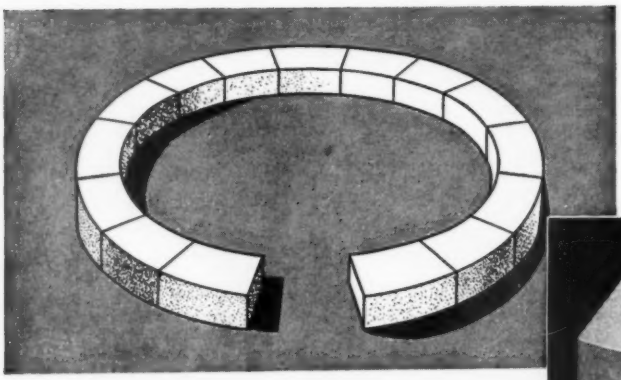

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The U180

SHELL CORE BLOWER

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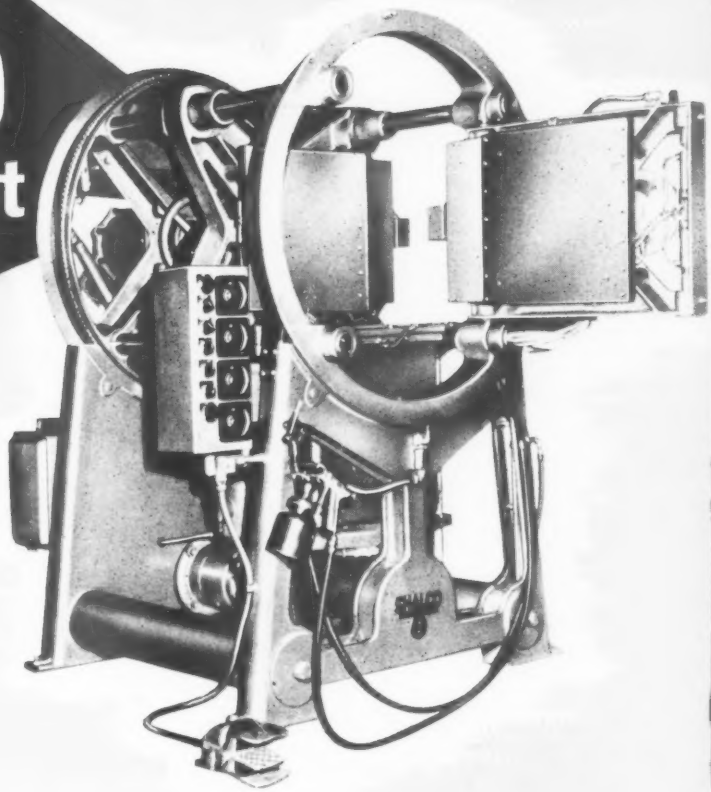

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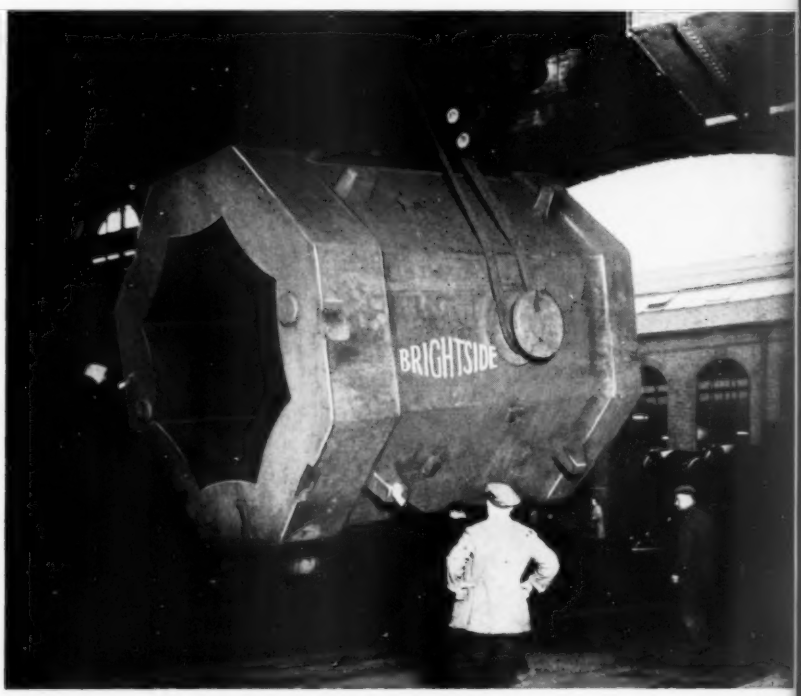

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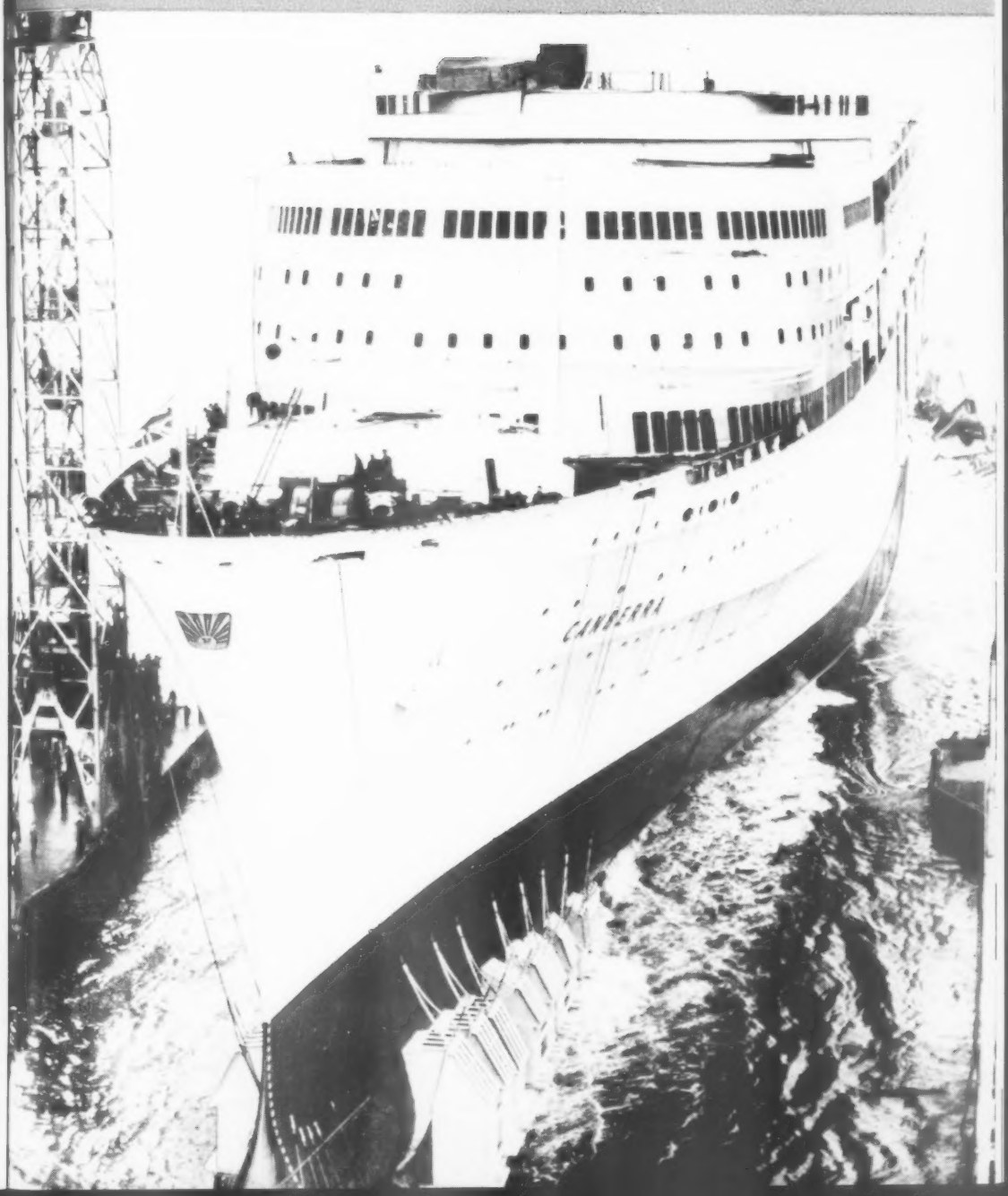
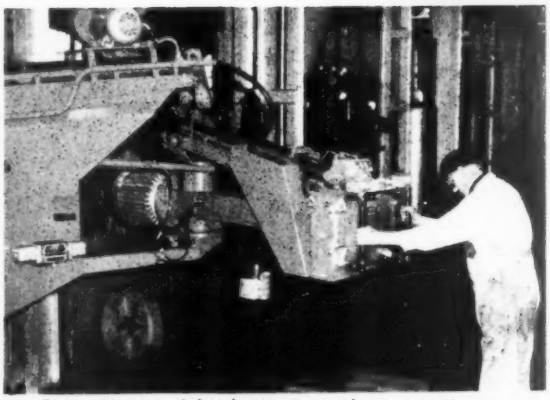
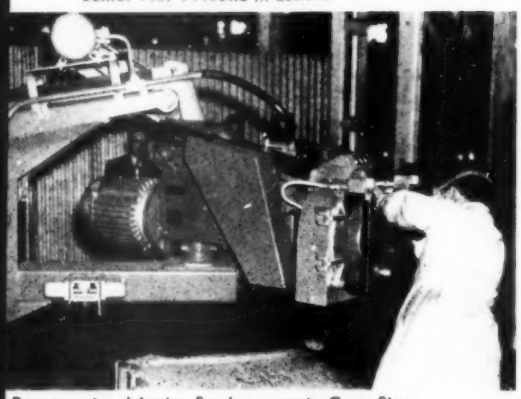


POWER ASSISTED SANDRAMMERS—

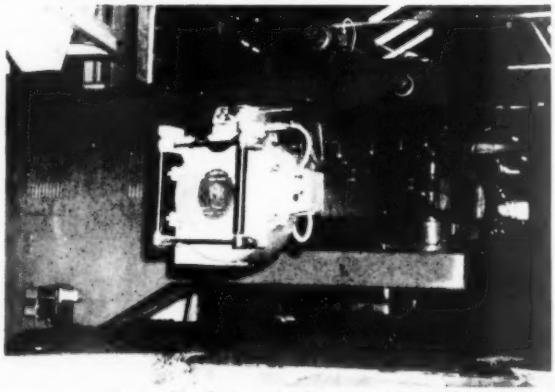
Senior No. 4 Mobile in action.



Senior No. 1 with hand grip operated power assistance.



Power assisted Junior Sandrammer in Core Shop.



Senior No. 2 operating by remote control.

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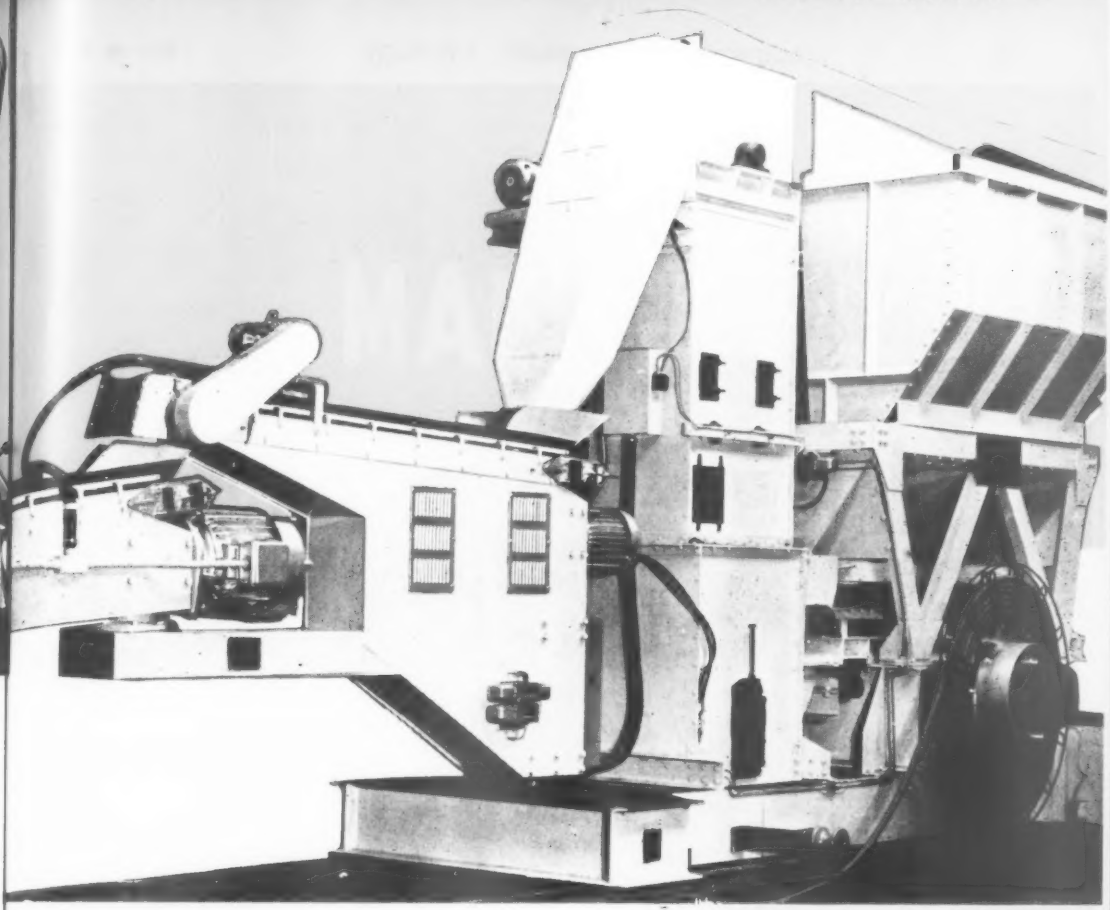

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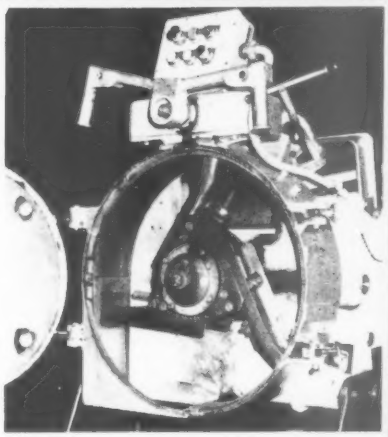

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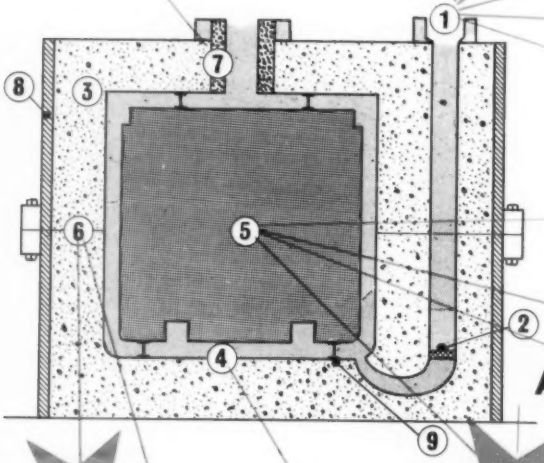

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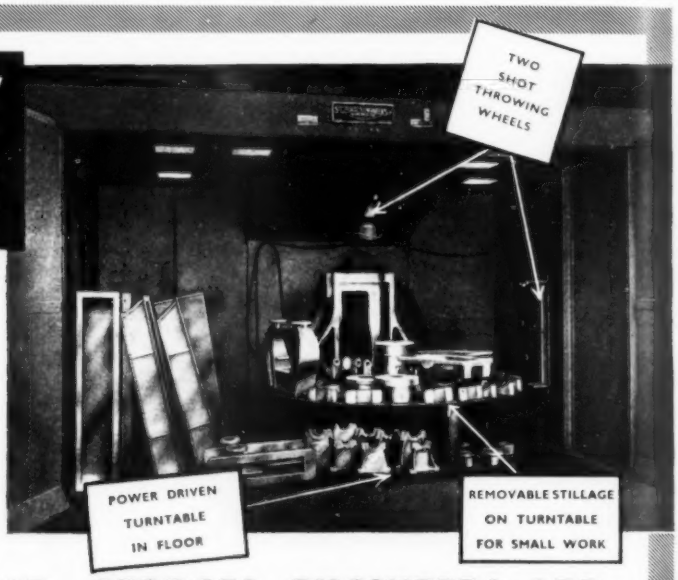

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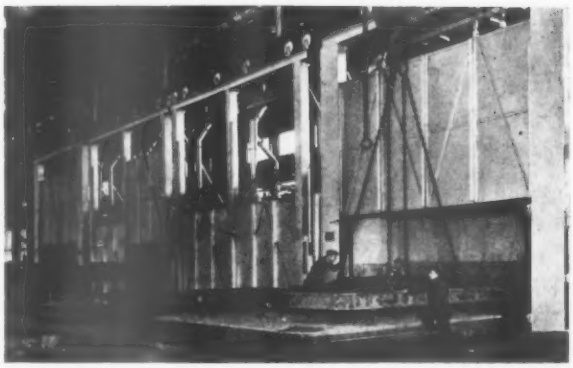

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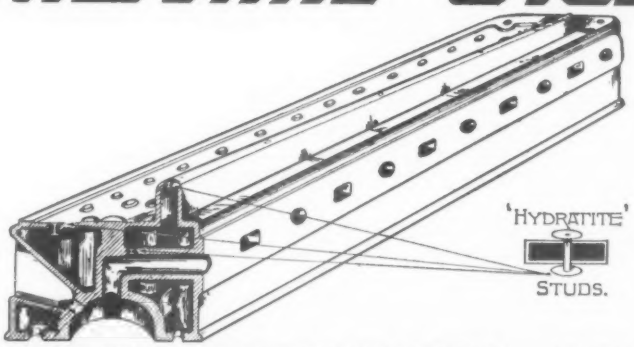

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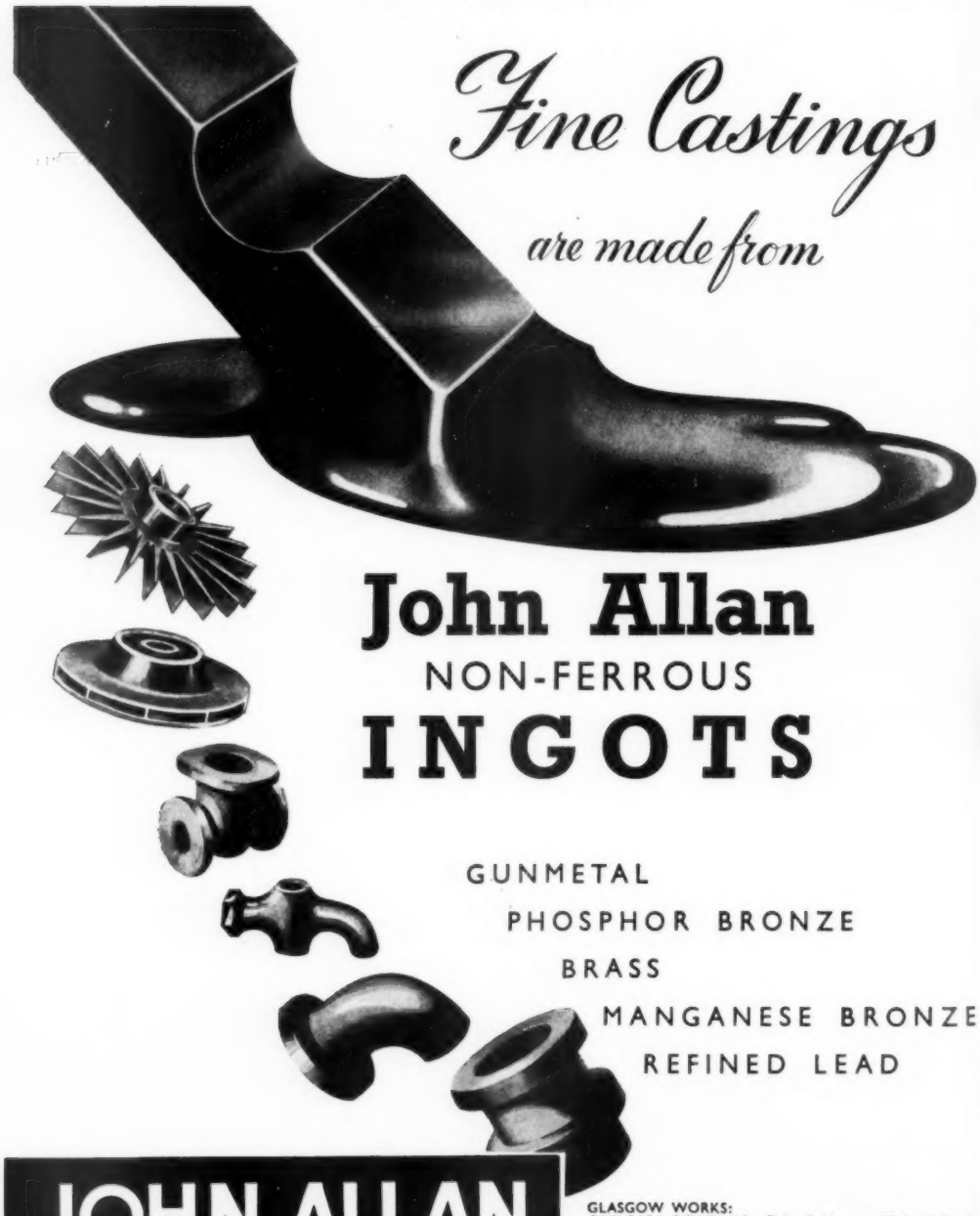

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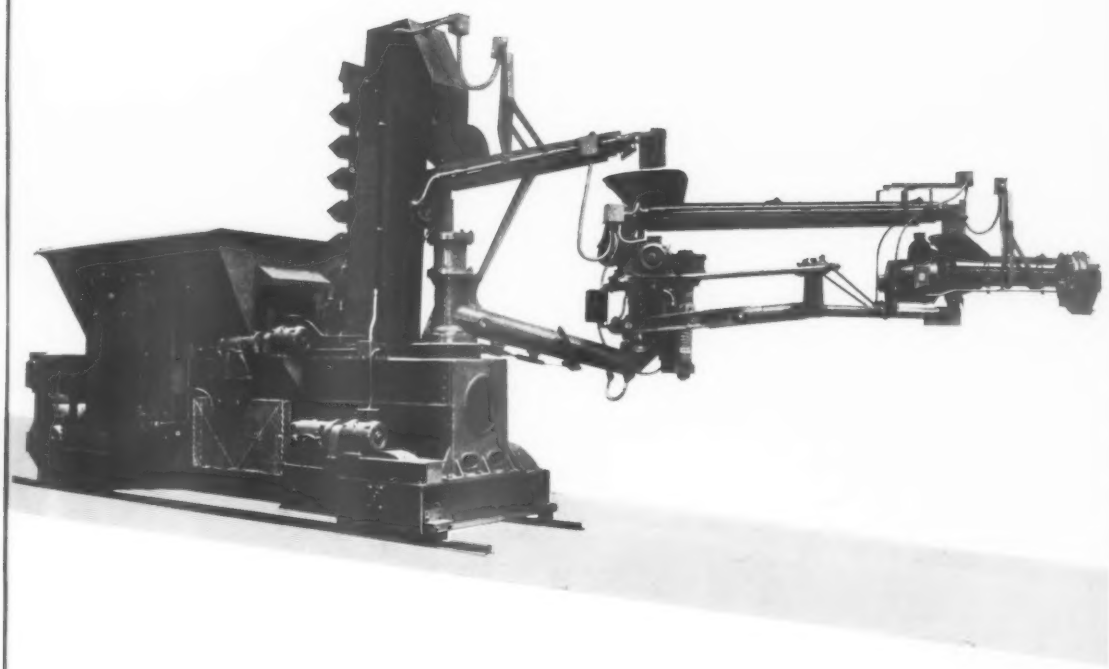

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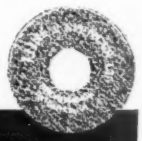

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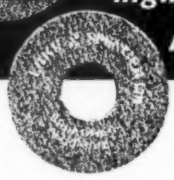

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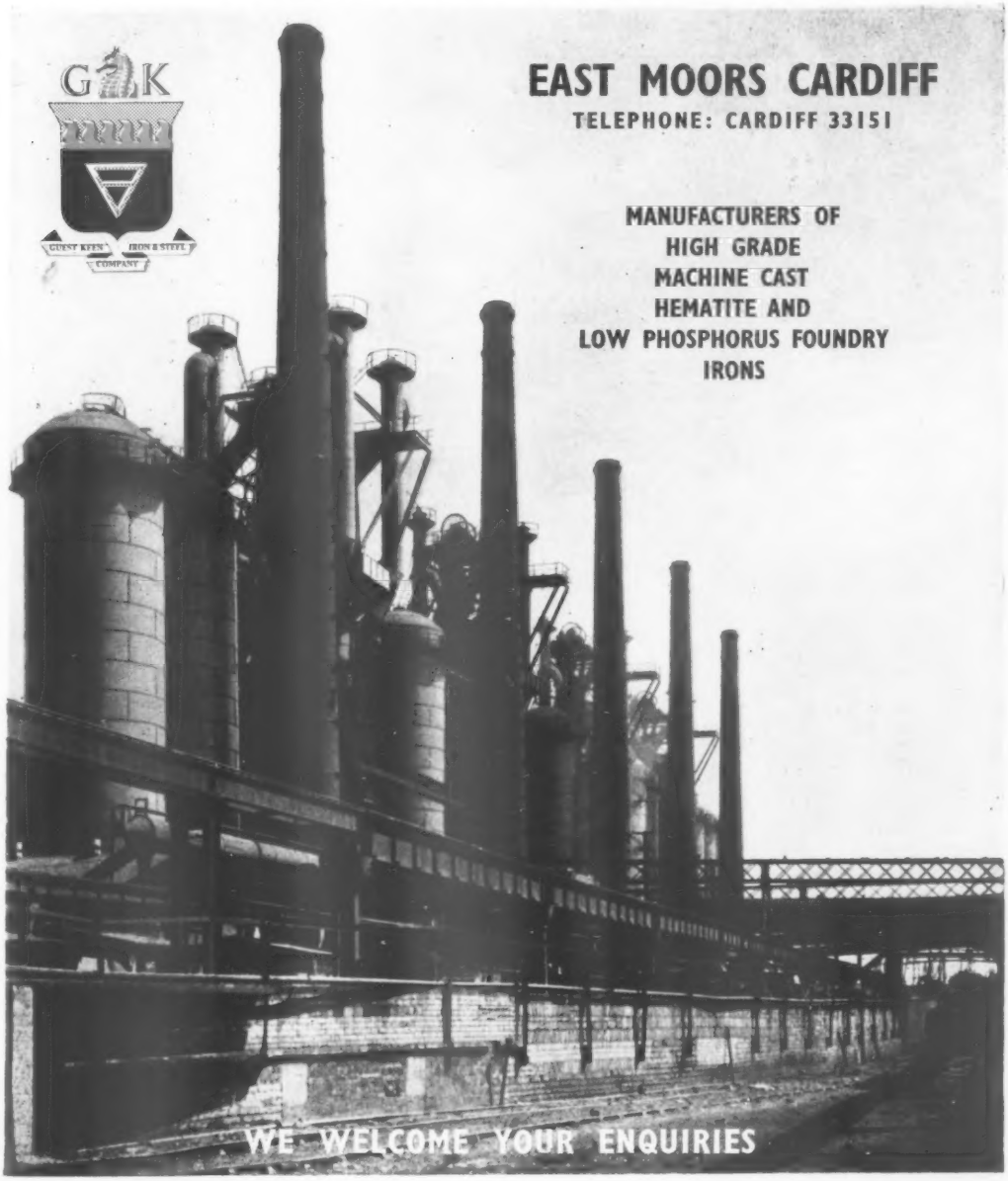

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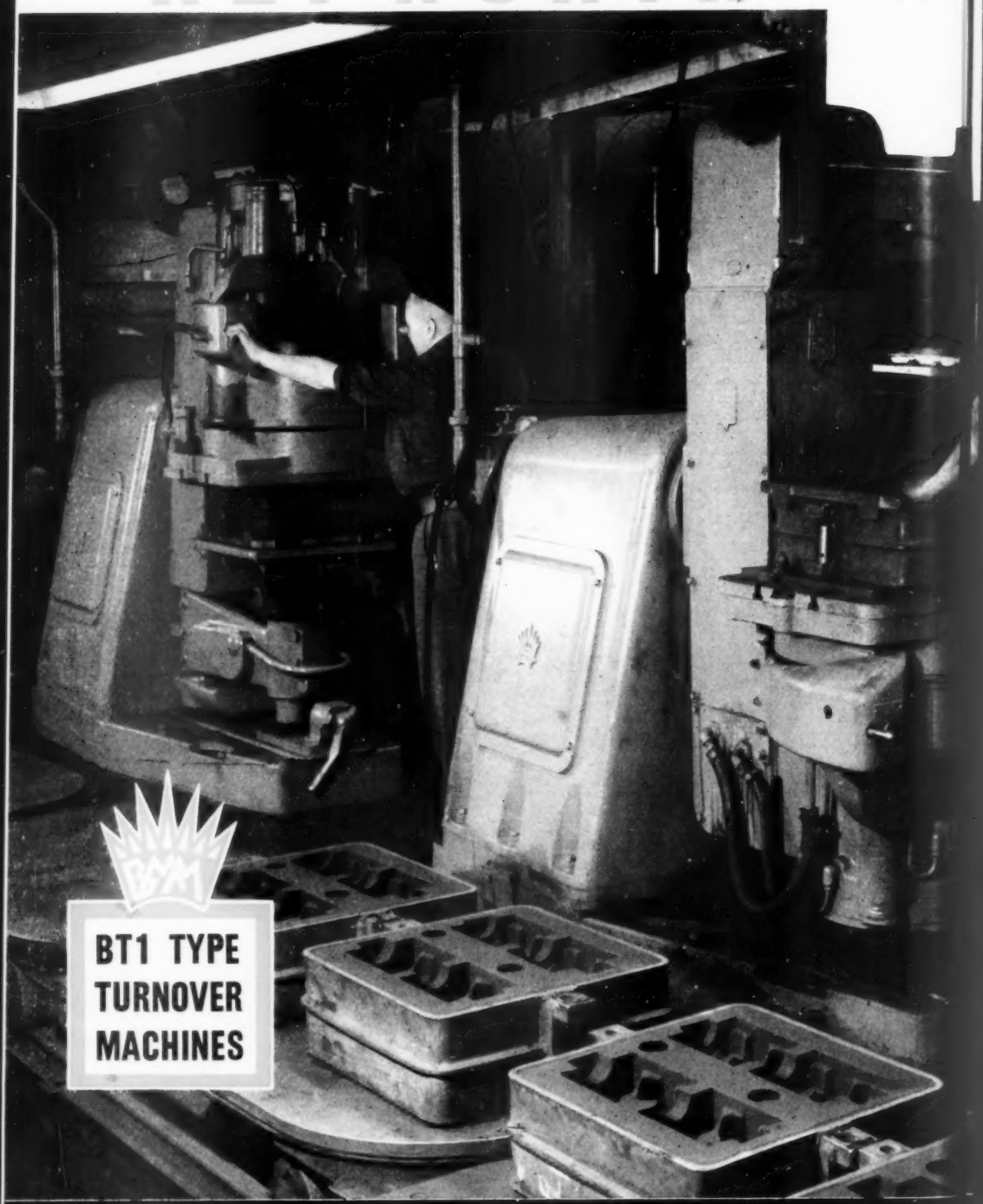

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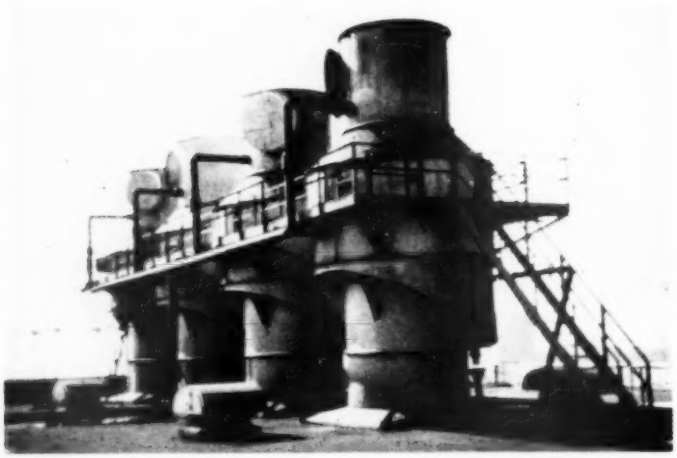

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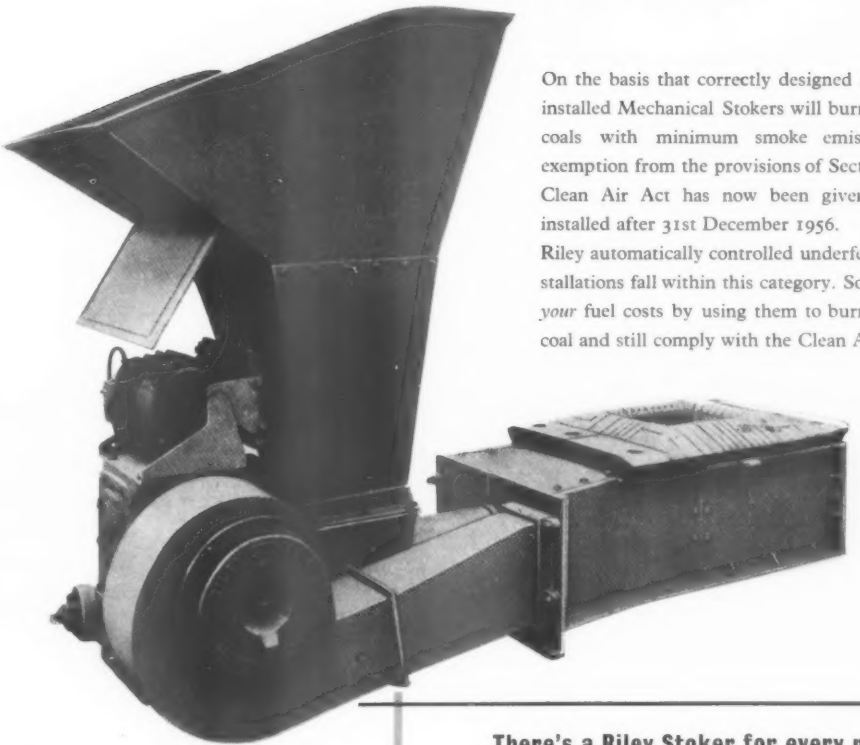

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FOUNDRY TRADE JOURNAL

Vol. 109 July 28, 1960 No. 2277

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French Foundry Research Activities in 1959

The annual reports of the *Centre Technique des Industries de la Fonderie* are invariably interesting, as they cover the whole of the French foundry industry from grey iron to die-castings. The *Centre* now employs 336, of whom 124 are on the staff. About 24 per cent of the *Centre's* activities is taken up in "*Consultations techniques aux fonderies*," which, one would gather, means development work. A further 22·1 per cent has been allocated to regional laboratories and 35·5 per cent on fundamental and other researches. It is interesting to report that 8·3 per cent of the total income of the *Centre* in the year under review (1959), was spent on work done in connection with the extensive French system of quality marks or labels, as they have been designated. The services of the *Centre* were used on 7,665 occasions in 1959, the services having been growing steadily since the 781 listed in 1945.

The part of the 1959 Report most interesting to UK readers is that dealing with the quality marks. The general classifications show that " labels " have been created for the following:—binders, blackings, domestic-heating apparatus, light-alloy domestic utensils, malleable cast iron, unalloyed grey iron, light alloys, copper-base alloys, and zinc-base die-castings. It is obvious that supervision is instituted to ensure that a high standard is maintained, in fact, no fewer than 1,243 visits were made in 1959 to firms operating the quality-mark scheme, and 1,625 samples were taken. Moreover, the system has not invariably resulted in granting an increasing number of licences each year; for example, at one time, 19 firms were approved for the making of malleable castings, but last year this number was reduced to 12. Some 60 iron foundries have been approved as compared with a relatively large number of light-alloy founders (90) and copper-base castings manufacturers (43). French steelfounders have so far not been included in this activity and some foundries are certificated for only a portion of their products.

A large part of the French report is given over to detailing the research activities of the *Centre* and those completed during the year each receive a few paragraphs, set out under the main sections of the industry. Under the heading " cast iron " is recorded a note on a patented process—French application No. 792,358. This relates to carbon control to precise limits in melting, when starting off with a low-carbon charge. It appears that the treatment is more than a simple recarburation in fact one of true inoculation and it is claimed that it is possible to obtain a pearlitic structure in a section thickness of about ½ in. with a composition of 3·7 per cent carbon and 0·9 per cent silicon. Amongst other claims for the process—made after making 1,200 *tonnes* of castings—are good-castability of the iron, a machinability better than conventional cast irons, production of sound castings (there being no defects ascribable to the treatment) and the use of a lower silicon for a given job, showing savings in the use of ferro-silicon. For steelfounders, the *Centre* has been carrying out researches with good results in the use of zircon sand and refractory clay for lining small ladles. It is pointed out, however, that such linings have a tendency —due to their low expansion when heated—to part from the steel shell. Other subjects dealt with in this Report are the nature of the blue fumes evolved during the operation of the shell-moulding process and here, maximum permissible concentrations are given if healthy conditions are to be established—and the decoring of castings made by the CO_2 Process. The report is extremely wide in its coverage and is very methodically presented.

Waste-heat recovery from Industrial Furnaces

The Institute of Fuel are organizing a conference on the subject of the recovery of waste heat from industrial furnaces, to be held from May 16 to 20, 1961, in Bournemouth. Its purpose is to deal with both the technology and the economic value of the various methods by which heat can be recovered. The papers to be presented at the conference fall into three groups, the first dealing with the principles underlying methods of recovering waste heat, the second with the actual equipment employed and the third with experience in recovering waste heat in various industries.

Contributions to be presented which are likely to be of special interest to foundrymen include the following: "Total Recoverable and Returnable Heat in Combustion Gases," by Professor Dr. Ing. P. O. Rosin; "Heat Transfer," by Dr. Margaret Fishenden, Professor O. A. Saunders and Professor D. B. Spalding, and "Aerodynamics," by Professor M. W. Thring and Dr. C. Hulse. Technical contributions dealing with equipment for recovering waste-heat will embrace a paper given by Professor Dr. Ing. A. Schack on "Metallic Recuperators." This will deal with the design and industrial application of metallic recuperators and will describe the materials, and other features of design, which have enabled metallic recuperators to be used at higher temperatures in recent years. A paper entitled "Regenerators" will be presented by R. Mayorcas, J. N. Edwards, M. J. McInerney, D. Meachen and Dr. N. P. Bacon and will deal with the theory of heat-transfer in—and the design and performance of—regenerators. The effect of regenerator design and performance on the economic efficiency of the open-hearth steel-melting process, with and without the use of oxygen, will be examined and the detrimental effect of dust on the performance of regenerators and its reduction by suitable design will also be considered.

A paper on "Evaporative Cooling" will be presented by Dr. Ing. F. Wesemann, Professor Thring and G. N. Critchley and the final paper which covers equipment will be given by W. P. C. Ungoed and C. E. Sayer on "Use of Waste-heat Steam for Generating Electricity." Other contributions will deal with waste-heat recovery in boiler plants, steelworks, in Russian industry, in coke-making, the glass industry, wrought non-ferrous metals and ceramic industries.

Greater UK/Japan Trade Forecast

Trade between Britain and Japan should increase by between £3,000,000 and £3,500,000 each way in the 12 months ending March 31, 1961, as a result of new trade arrangements which were agreed on July 15. Britain has granted Japan quota increases totalling nearly £3,000,000 and Japan has embarked on a programme of trade liberalization.

Measures include substantially enlarged global quotas for such items as cars, machine-tools, and crawler tractors.

Japanese Foundrymen's Society

The *Nippon Imono Kyokai* (the Japan Foundrymen's Society) announce that they have re-elected as chairman Mr. Kanshichi Tanaka, of the Kubota Iron & Machinery Works, Limited, No. 22, 2-chome, Funaide-cho, Naniwa-ku, Osaka, and as secretary, Mr. Takayoshi Hamamura. The new address of the Society is Toyokawa Building, No. 4 8-chome, Ginsahigashi, Chuo-ku, Tokyo.

British Non-ferrous Metals Federation

The British Non-Ferrous Metals Federation has elected Mr. W. W. Dolton, managing director of the Delta Metal Company, Limited, and of Copper & Alloys, Limited, Extruded Metals Company, Limited, Heaton & Dugard, Limited, and of Moore Bros. (Birmingham), Limited, president for the ensuing year. Mr. Michael Clapham, joint-managing director of the metals division of Imperial Chemical Industries, Limited, Mr. C. H. M. Holden, chairman of V. J. Copas, Limited, and managing director of Charles Clifford, Limited, and Hall Street Metal Rolling Company, Limited, and Mr. W. F. Slater, director and general manager of Thomas Bolton & Sons, Limited, have been re-elected vice-presidents.

Mr. H. F. Sherbourne, chairman of Anson Units, Limited, managing director of Yorkshire Imperial Metals, Limited, and Yorkshire Copper Works (Holdings), Limited, has been elected a vice-president and Mr. W. F. Brazener, managing director of the Mint, Birmingham, Limited, has been elected treasurer in place of Mr. A. L. Johnson, who has retired.

Latest Foundry Statistics

Steel Castings: Employment in steelfounding, as reported in the joint *Bulletin* of the Iron and Steel Board and the British Iron and Steel Federation, was lower than the previous month when recorded on May 7. The total was 17,780 as against the April figure of 18,030, but it is still higher than a year ago (17,330). The average weekly production of steel castings during May was, if the provisional figures be confirmed, quite good, 6,000 tons. In April it was estimated to be 5,400 tons and in May last year (still estimated), 4,700 tons.

Light-alloy Castings: The Ministry of Supply announce that during April the production of aluminium castings was 8,989 tons, comprising 1,940 tons made from sand moulds, 4,737 tons as gravity-die and 2,312 as pressure-die-castings. The output of magnesium-alloy castings was 144 tons.

Copper-base Castings: In their *Bulletin* the British Bureau of Non-Ferrous Metals Statistics announce that the production of copper-base castings during May was 7,284 tons. The output of the industry for the first five months of the year was 36,598 tons.

Public Works and Municipal Services Congress and Exhibition

The Public Works and Municipal Services Congress and Exhibition is to be held at Olympia, London, from November 14 to 19. Nearly 400 firms will be represented, and their exhibits will form a most comprehensive range of equipment designed to meet the modern requirements of public and local authorities. The Congress sessions, of which there will be more than 20, will be held from the Monday to the Friday and will be open to all visitors to Olympia.

LAND FOR A FACTORY at Brantford, Ontario, has been acquired by Renold Chains, Limited, precision chain engineers, of Wythenshawe, Manchester, which has established a new manufacturing subsidiary in Canada. The operation is designed to support expanding sales of the company's products marketed by the sales subsidiary, Renold Chains Canada, Limited.

Glass-mould Manufacture at Dilworth & Carr, Limited

Mechanized Unit Tailor-made to suit Old-established Preston Foundry

When it was realized that much of the "hoodoo" and secrecy surrounding glass-mould manufacture could be debunked, and a greatly expanded output was required, it was decided to instal a mechanized production unit for making the moulds in the existing iron foundry of Dilworth & Carr, Limited—one of the United Glass group of companies—at Preston. What follows are historical notes on the Preston works, followed by a description of the new plant and the way it had to be tailored to fit into a corner of the iron foundry.

When the firm of Dilworth & Carr, Limited, at Preston, Lancs, was founded 85 years ago to "carry out the design and installation of central-heating, hot-water supply and ventilation of industrial buildings, etc.," few could have visualized the growth and changes which would take place over the next three-quarters of a century. To-day, the original activities concerning radiators and heating engineering are no more, but other activities have flourished and still further developments are forecast.

History

The company's premises in Bow Lane, Preston, were built in 1904, and by that time Mr. Dilworth had been joined by the other partner whose name was to be perpetuated in the company's title. Although the company is now an important member of the United Glass engineering division, it is still known as "D & C" not only in Preston, but throughout the British engineering industry. Thus the company and its personnel, although retaining their individuality, enjoy the benefits of pension schemes and all the other facilities of a large combine, including expansion and development in step with the group as a whole.

About 1910, the first part of the foundry was built for the purpose of making cast-iron hot-water piping and eventually it was decided to make flanged piping. The first consignment of 4- and 6-in. dia. flanged pipes was despatched to Ship Street Barracks, Dublin, in 1913. The foundry was extended in 1917 to help meet orders for war materials and this extension is still known as the Scotch Shop. It is here, to-day, that special flanged fittings are made by shell moulding, thus utilizing a modern repetition method. In 1920, a London office was opened by the firm to deal with estimating contracts for the Southern area, but this was closed in 1946 when the company ceased carrying out any further outside contracting work for heating installations.

After the depression years of the early 1930's, the company decided to develop their machine-shops and, in 1936, the first link was made with the United Glass group, when Dilworth & Carr received their first order for spare parts from what was then the United Glass Bottle Manufac-

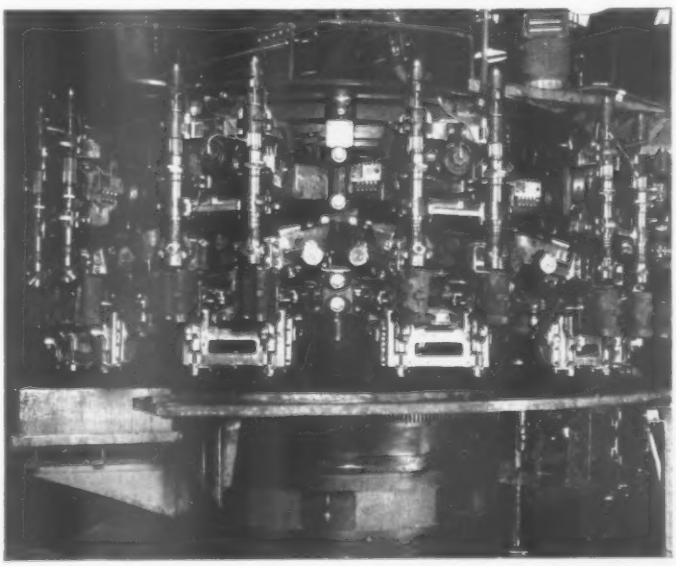


FIG. 1.—*Complete Stemware glass manufacturing plant made by Dilworth & Carr, Limited. This Westlake machine, made during 1959 for the Ravenhead factory of United Glass, Limited, indicates the complexity of such units and the variety of castings incorporated.*

Mechanized Unit at Dilworth & Carr

turers. It was some 14 years later before D & C amalgamated with United Glass—one of the largest manufacturers of glass bottles and containers in Europe, employing over 10,000 workers in twelve factories in England and Scotland.

Typical of the variety of work undertaken by Dilworth & Carr was its production for the aircraft industry. By 1937, orders had been received for aircraft parts, principally for the Bristol Aeroplane Company. The spate of orders received for war work in 1939 and the years that followed resulted in a rapid expansion of plant and experience which has contributed much to the firm's present-day capabilities.

Present-day

As a result of the take-over by United Glass in 1950, considerable impetus was given to the manufacture and erection of complete machines for glass-bottle making. In addition to the manufacture of precision machine parts, the company enjoy a considerable business in cast-iron flanged pipes up to 60-in. dia. (mainly for power-station installations), together with segregating valves and special equipment for ash-handling, and castings and equipment for the assembly of emulsifiers and centrifuges. Equipment made by the company has been sent to all parts of the world, including India, Spain, Turkey, and Greece. There are, in fact, few modern power-stations in Great Britain which do not contain equipment made by this company, as they are one of the few firms in this country which specialize in large cast pipes of a non-standard nature. For example, D & C pipes were supplied to Calder Hall atomic-power station and to the new Berkeley station and, during recent months, the company has been engaged on work for several gas-undertakings.

Machine-shop Activity

The machine-shops of Dilworth & Carr are engaged in the manufacture of machines and spare parts mainly for the glass industry and principally for its parent company, United Glass, Limited. This business has been built up over the past years and technical staff have had the benefit of experienced works engineers at United Glass factories to assist them in developing both correct design and manufacturing technique on work which still demands a very high standard of craftsmanship.

Complete Plants

During 1959, a complete Stemware manufacturing plant was made for the Ravenhead factory of United Glass and following this, a similar plant was ordered by a Belgian glass company. This plant consists of a Westlake machine (Fig. 1) for producing Stemware bowls which weighs about 30 tons. The machine is a suction type—glass being sucked from a tank into the moulds—and is fully automatic up to the point where the bowl is removed by hand and loaded on to a conveyor which runs to a M.P.A. press for pressing the foot on to the bowl. This machine moves in a circular direction with 12 stops controlled by a geneva cam, the press action at each stop being effected by an air-controlled cylinder. The glass and foot are removed by hand from the moulds on to an automatic conveyor which despatches them to the foot former. The machine is capable of performing at the rate of 50 to 60 per min. and a finished article is therefore issuing from the plant at the same rate. The manufacture of such a plant calls for efficient planning and utilization of machine-tool capacity and takes up something in the order of 30,000 man/hours. (It is interesting to note in passing that Dilworth & Carr has spent some £13,000 on machine-tools in the past year or so.)

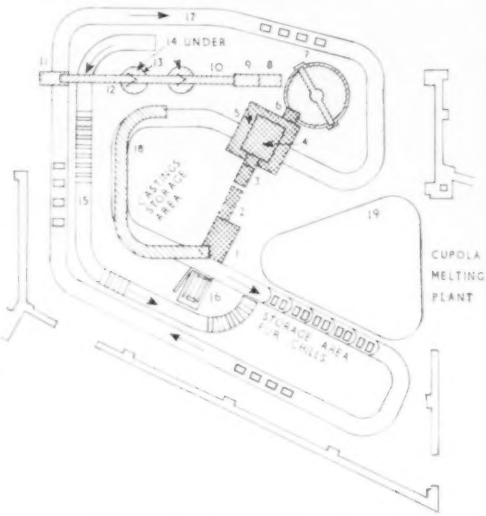


FIG. 2.—*Layout plant of the new mechanized unit installed in a corner of the iron foundry of Dilworth & Carr, Limited. (Sections have been cross-hatched to indicate the knock-out sand, prepared-sand and empty-box-return systems.)*

Key:
(1) Vibrating knock-out and chute; (2) belt conveyor, with magnetic head-pulley; (3) belt and bucket elevator; (4) rotary screen, with rejects chute; (5) storage hopper; (6) feeder belt; (7) sand mill; (8) belt and bucket elevator; (9) cage-type disintegrator; (10) belt conveyor; (11) surplus-sand chute; (12) Vee ploughs, with side chutes; (13) conical hoppers, and discharge gates; (14) moulding machines; (15) mould track; (16) pneumatic mould-pusher; (17) mould conveyor (75 pallets); (18) empty-box return-track, and (19) overhead pouring runway.

Mechanized Moulding Plant

The idea of installing a mechanized moulding-plant for the production of cast-iron mould-blank and mould-equipment castings was first contemplated by Dilworth & Carr some two years ago, as it was considered that the manufacture of these castings by such means would be a considerable asset to the United Glass group in general. A survey was carried out and immediate results showed that the whole process of manufacturing mould castings was shrouded in secrecy and that no factory in Great Britain was making moulds

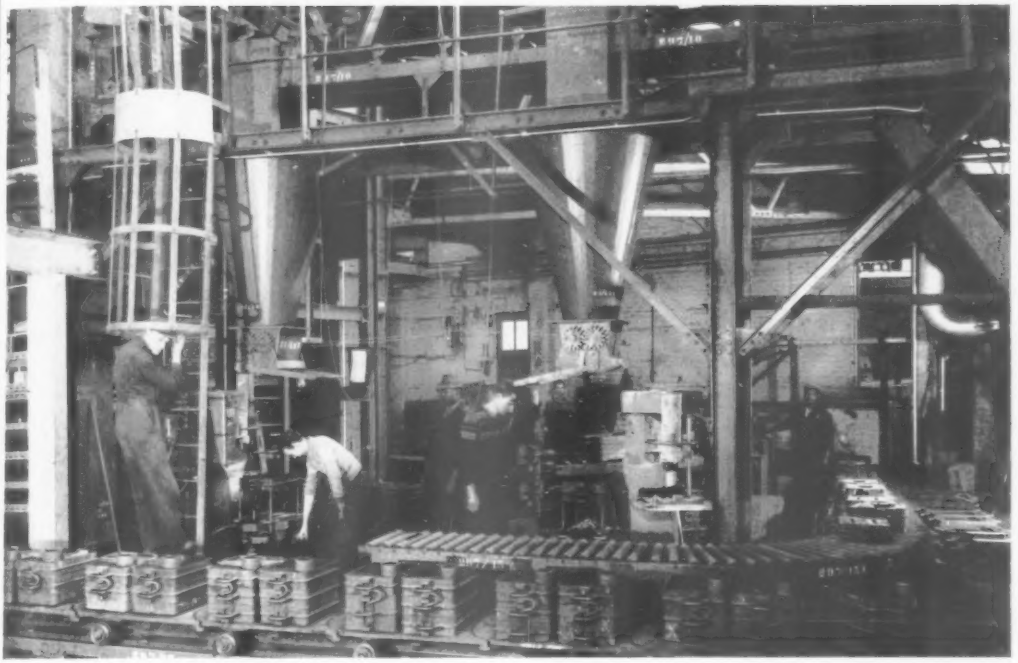


FIG. 3.—*General view of the new unit, showing the moulding machines and the sand system serving them; the roller conveyor taking the half-moulds and, in the foreground, the pallet conveyor carrying two moulds per pallet to the pouring station. (All conveyor and sand-plant movement is synchronized from a centralized control pedestal).*

by this method. After a short period, it was decided to produce these mould castings by the plate-moulding method—an operation well familiar to foundrymen, where patterns are mounted on a plate which fits the moulding-box pins exactly and thus removes a large element of human error from the moulding process. The company was successful after considerable experimenting in making these castings equally as good as any others produced.

The next logical step, therefore, was to investigate the possibilities of mechanizing the moulding operation and for this, advice was sought from Foundry Mechanisations (Baillot), Limited, of Bletchley, Bucks, specialist manufacturers of this type of plant. After lengthy discussions, a scheme was drawn up to produce 50 pairs of mould castings per hr.

Details of the Plant

The most unusual feature of the mechanized moulding plant supplied by Foundry Mechanisations (Baillot), Limited, is the " made-to-measure " design (Fig. 2). Although the mechanized unit is of quite small capacity by some standards, the layout was difficult owing to the limitations of floor- and headroom space available. This was particularly so with the mould conveyor, which had to " snake " its way within the allocated space, avoiding many obstructions, yet still leaving sufficient room for the pouring and knocking-out operations. The length of the conveyor was dictated by the fact that to accommodate the company's request for adequate cooling time, moulds had to travel at an average speed of 1-ft. 3-in. per min.

The plant is equipped with two (BMM) moulding machines (Fig. 3), each capable of producing 50 boxes per hr. It also has a powered conveyor which stops automatically every 15 ft.; a pneumatic pusher for pushing the boxes off the conveyor on to a vibrating knock-out which shakes the sand from the box and allows the casting to remain on top; an underground belt which conveys the sand thus knocked out up an elevator into a storage-hopper of 10-ton capacity, then down into a mixer which prepares and reconditions the sand for re-use. The sand then passes through the bottom of the mixer, up an elevator, and along a delivery conveyor equipped with deflectors to deliver prepared sand into small storage hoppers over each machine. After the machine operators have produced half-moulds on the jolt/squeeze machines, they are pushed along a gravity roller-conveyor to the powered conveyor, where they are closed and

FIG. 4.—*Section of the roller conveyor (with the pouring conveyor alongside) on which an operator is cleaning moulds and placing cores and chills prior to closing the boxes.*

placed on the pallets, which are capable of accommodating 200 boxes along the 225 ft. of track. The purpose of the halting of the conveyor every 15 ft., is to allow the pouring to be done while moulds are stationary. Thus, whereas the moulding is continuous, the pouring is intermittent, 10 moulds being poured at a time. One complete cycle which includes the approach of 10 moulds on to the conveyor, with two moulds per plate, the opening of the moulds for coring-up or introducing the chills (Fig. 4), closing, weighting, pouring (Fig. 5) and moving the conveyor a further distance of five plates, requires a period of 12 min. maximum. This takes care of the 50 moulds produced hourly and although the mould conveyor is so arranged as to stop automatically every five plates, it is re-started manually. It takes four hours to mould and cast 200 boxes, each containing a pair of glass-mould castings. The whole plant is manned by nine men, working on a group-production bonus scheme.

Sand Plant

The sand mill, supplied by Foundry Mechanisations, is the S.B.7 model and is fitted with a special device which enables the milling operation to be carried out in batches or continuously, the change-over from one operation to the other and *vice versa* being virtually instantaneous. When used on batch production, the mill output is approximately 3 tons of prepared sand per hr., whereas when it is continuously operated, 6 tons can be obtained hourly. The sand plant has been designed in such a way that the existing sand-storage capacity can be duplicated without disrupting the operation of the plant, should this be found necessary at a later date. The complete mechanized moulding plant has cost in the region of £22,000.

Metal

To ensure a quality-controlled metal of the recommended analysis, Keighley Laboratories regularly analyse samples of the metal melted and advise on its suitability for producing glass moulds. So far, Dilworth & Carr have produced a metal which, after heat-treatment to stabilize the structure, offers great encouragement for their future production on this plant. At the time of the writer's visit, a new cupola situated adjacent to the mechanized unit was just being put into operation to supply the molten metal required.

Castings which can be produced more consistently and much cheaper than by former methods used in the industry are the basic objectives of the new mechanized plant—objectives which are already well on the way to full realization.

Amenities

Dilworth & Carr can be described as a firm which looks after its employees, and consistently follows a policy of promotion within the organization. For example, within recent months, a machine operator has been promoted to machine-shop superintendent, a fitter has been made an assembly supervisor and members of the executive staff have also been promoted—two to the board of directors and one to the position of secretary to the company. The company is also proud of its long-service employees, and at recent celebra-

FIG. 5.—*Pouring section of the mould conveyor. Ladles are suspended from an overhead monorail and movement is motorized both for hoist and travel.*

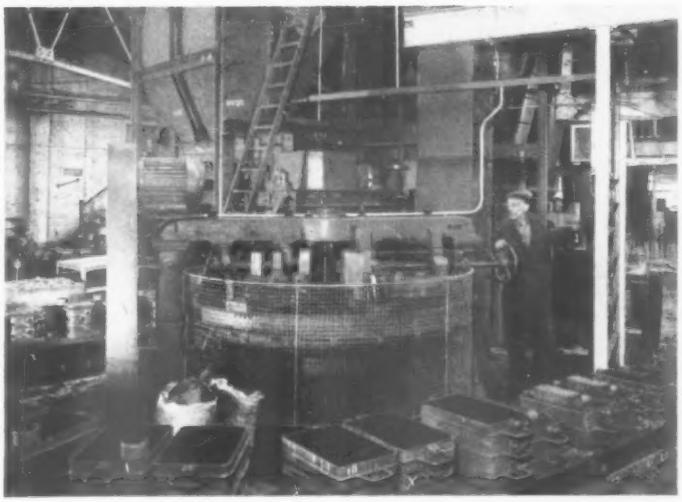


FIG. 6.—*Sand plant serving the mechanized section at Dilworth & Carr, Limited. In the centre is the sand mill (either batch or continuous, according to choice), and in the background are the elevator and storage hopper. The whole sand plant is accommodated inside the mould-pallet track.*

tions (see JOURNAL, April 7) no fewer than 12 persons received awards for 25 years or more service—this from a company which even to-day has only 200 workpeople!

The firm has an active sports and social club and the members organize regular cricket, fishing and bowling contests. On the social side, a most successful Christmas party for employees' children is held each year.

Acknowledgment

The writer makes grateful acknowledgment to the directors and staff alike of Dilworth & Carr and United Glass for according facilities and help in preparing this account and for assistance in its illustration.

Future of Nuclear Power in the UK

British research and development costs on nuclear power-plants are of the order of 30 per cent. of the capital expenditure, or about six times as great as the comparable research and developments costs for conventional oil and coal-fuelled power stations, and are likely to remain so until the early 1970s. Sir Christopher Hinton, FRS, chairman of the Central Electricity Generating Board, stated this in his Royal Society Tercentenary Lecture in London last week.

It was reasonable to aim at continuing this high rate of research and development expenditure, and the resulting advance in nuclear technology, to the point where nuclear power costs broke even with those of conventional power.

Demand for electricity had a doubling period of 10 years and the total fuel requirements of the Board (expressed as coal equivalent) was now 54,000,000 tons per year and would rise to 90,000,000 tons per year by 1970. It was improbable, said Sir Christopher, that sufficient British mined coal would be available to meet the Generating Board's total fuel requirements by some date early in the 1970s.

When nuclear power broke even in cost with conventional power there would then be freedom to manoeuvre in a three-fuel economy. "After that date, which is not remote," he added, "it is surely reasonable to think that research on reactor technology should be justified by savings which can be expected to arise from its industrial application."

It was interesting to speculate how much the downward trend in the cost of conventional power could be increased if it could attract as great a research and development effort as its nuclear rival. "There is no suggestion that it should attract such expenditure, but it is suggested that redeployment of research and development resources must be carefully considered."

London Quotation sought by German Steelmakers

Application for a London quotation for the capital of August Thyssen-Hütte, AG, is considered to be a major event for the market and this is the first occasion since the war that a European company has sought an official quotation on London. ATH is the largest single steel manufacturing group in Europe and its capacity of about 4,000,000 tons of steel—to be raised by 25 per cent. over the next two or three years—exceeds that of the United Steel Companies, Limited, by about a third.

The original steelworks was founded in 1890 by August Thyssen and was inherited by his son, the late Fritz Thyssen, in 1926. Fritz Thyssen built it up into Vereinigte Stahlwerke, and after first supporting Hitler broke with him and emigrated to the Argentine. He died there in 1951. His widow and daughter hold about half the equity of ATH and Frau Thyssen about half the shares of Phoenix Rheinrohr, Germany's biggest makers of tubes. Both companies work in close conjunction, but a recent attempt to link them even more closely was resisted by the High Authority of the European Coal and Steel Community.

In 1958-59 ATH accounted for more than half Germany's output of hot-rolled wide-steel strip and over a quarter of its wire-rod production. Even when the industry was recovering after the recent recession, ATH sales rose to £156,000,000 and its trading profits to £25,000,000, while its dividend was about twice covered.

The company has the advantages of having almost entirely post-war equipment and has spent some £104,000,000 on plant since 1949.

Mr. K. N. SWASH and Mr. M. A. SLATER have joined the board of Contactor Switchgear, Limited.

Steel Output Maintained

Adjustments made to correct the rates of steel production for interruptions caused by the Easter and Whitsun holidays and other seasonal influences show that production maintained a moderate rate of advance during the first half of 1960 after the substantial upswing during 1959. Production in June, which was affected by the Whitsun holiday, was at an average of 466,400 tons a week, compared with 475,400 tons a week in May, and with 388,500 tons a week in June, 1959.

The Iron and Steel Board states that the June figure indicates that steel production made a recovery from the temporary setback in May which had resulted partly from the bunching of repairs at steelmaking furnaces and partly from the interruption of the flow of pig-iron during the relining of blast furnaces at integrated plants.

Production of pig-iron in June averaged 295,200 tons a week compared with 299,100 tons a week in May and with 235,300 tons a week in June, 1959.

Estimates and Actuality

Production of steel in the first half of the year amounted to 12,390,000 tons and is in line with the total which had earlier been expected for the year as a whole. This was put at 24,300,000 tons in the estimates prepared at the end of the first quarter.

So far this year the recorded tonnages (with seasonally corrected figures in parentheses) are as follow:—January, 471,000 (452,000) tons; February, 482,000 (458,000) tons; March, 485,000 (453,000) tons; April, 478,000 (460,000) tons; May, 475,000 (438,000) tons; June, 466,000 (465,000) tons.

The seasonal corrections are based on an analysis of the seasonal variations in output during the past 10 years and should be treated as provisional. A technical note on the method adopted is in preparation and is to be issued by the Iron and Steel Board shortly.

Latest pig-iron and steel output figures (in tons), with the corresponding 1959 returns, are shown in the following table:—

Period.	Pig-iron.		Steel ingots and castings.	
	Weekly average.	Annual rate.	Weekly average.	Annual rate.
1960—April ..	310,600	16,150,000	478,100	24,861,000
May ..	299,100	15,554,000	475,400	24,723,000
June ..	295,200	15,353,000	466,400	24,255,000
Half year ..	302,800	15,745,000	476,400	24,772,000
1959—April ..	231,300	12,027,000	387,300	20,139,000
May ..	240,500	12,504,000	384,600	19,999,000
June ..	235,300	12,235,000	388,500	20,200,000
Half year ..	229,700	11,943,000	371,600	19,321,000

THE THORNCLIFFE WORKS of Newton Chambers & Company, Limited, Chapeltown, Sheffield, were visited on July 7 by members of the Yorkshire and Lincolnshire branch of the Institution of Highway Engineers. Among other work seen by the 100 visitors (who were led by Mr. A. Wikeley, engineer and surveyor of the Wortley Rural District Council, chairman of the branch) were large components for what are claimed to be the world's biggest dragline excavators. After the tour, the visitors were the guests at luncheon of the Master Cutler, Mr. P. J. C. Bovill, managing director of Newton Chambers.

Industrial Training in Operational Research

Introduction of a graduate apprenticeship scheme for specialized training in operational research is announced by the British Iron and Steel Research Association. The purpose of the scheme is to train recruits, not only in the specialist techniques but also in the practical art of applying these methods to actual industrial problems.

During the two-year course the apprentice will be regarded as a temporary member of BISRA staff at a salary of £700 per annum at the age of 21, with an extra £25 per annum for each year above that level. Training will consist of day-to-day experience as a member of a team engaged on actual problems in the steel industry followed by a more formal course in techniques, arranged in collaboration with the London School of Economics. The course will culminate in an examination for the diploma in operational research recently instituted by the LSE. The basic qualification for an apprentice is a good degree in a pure or applied science, mathematics, or statistics.

BISRA's operational research department, which is sponsoring the scheme, was started in 1946, and has a wide industrial experience of operational research. The new scheme provides an unusual opportunity for the ambitious man to acquire a first-class training in a rapidly expanding field. Further particulars can be obtained on application to BISRA's personnel officer, at 11, Park Lane, London, W.1.

Diploma or Degree?

Dr. H. L. Haslegrave, principal of Loughborough College of Technology, said at the annual presentation-day ceremony on July 14, that although the College had increased its standards of entry for the session, the number of young people fully qualified for higher technological education was smaller throughout the country than had been estimated. He said that universities had places to spare and offered them to many students who had been accepted at Loughborough. This meant that the number of undergraduate students at Loughborough fell by about 2 per cent. on the previous year.

"This experience," said Dr. Haslegrave, "poses two vital questions concerning national policy. Will there be enough young people capable of the higher education obtainable in universities and colleges to fill the 180,000 places that are being mooted for universities in the 1970's and the unspecified numbers of places in colleges of advanced technology, without depreciation of standards? Will students be satisfied with the award of a diploma for a course of study which is at least as exacting and just as educationally sound as a course at a university, instead of obtaining a degree, an award that has been established for 600 years?"

Prizes were presented by Sir Herbert Manzoni, of Birmingham, president of the Institution of Civil Engineers.

Bath-foundry Merger

The directors of Allied Ironfounders, Limited, and Bilston Foundries, Limited, have agreed to a merger. The activities of the latter concern have been adversely affected by teething trouble experienced in the operation of their new foundry, and no final payment is recommended for the year ending March 31, 1960. Shares are to be exchanged on the basis of two £1 Allied shares for 15 of the 2s. shares in Bilston.

British Steel Castings Research Association

Seventh Annual Report, covering the period April 1, 1959, to March 31, 1960.

Sections abstracted previously* from the BSCRA annual report dealt with the research station extensions, committees, external relations and information service, and concluded with reports of research in progress—steelmaking, and foundry processes. The section on metallurgy is now continued, followed by outlines of the work proceeding on plant engineering, atmospheric pollution and industrial health, and concluding with a brief mention of ultrasonic testing work which has proved quite fruitful.

Metallurgy

(continued)

Intergranular Fracture in Steel Castings

This investigation is being conducted in the metallurgy department of Sheffield University under the direction of Professor A. G. Quarrell.

Intergranular fracture surfaces in cast steel have been studied by electron microscopy using a carbon extraction replica technique. Several commercial 1½ per cent. Mn steels have been examined in this way, and although aluminium nitride precipitates have been found, these were on crystallographic planes extending from grain boundaries into the grains, and not on the fracture surfaces. Large lamellar precipitates were found on the fracture surfaces and have been tentatively identified by electron diffraction as MnO or MnS.

In laboratory heats, intergranular fracture was synthesized by using 6 lb. per ton of aluminium and calcium cyanamide. Electron diffraction studies on the steels made with these treatments suggested that the precipitates were $FeO.Al_2O_3$, although the correlation in "d" values was not exact.

In vacuum-melted steels, where oxygen in the melt was reduced to an absolute minimum, a precipitate was again produced along prior austenite grain boundaries. This precipitate, which in every case gave rise to intergranular fracture, has not yet been positively identified. It is, however, considered to be related to the presence of nitrogen, since steels deoxidized with 6 lb. per ton of aluminium melted under a nitrogen atmosphere at low pressure exhibited intergranular fracture, while similar steels melted under an argon atmosphere did not.

Microsegregation in Steel Castings

A review of the available knowledge on this subject has been made and a programme of research planned. The most obvious tool for quantitative assessment of microsegregation is the Castaing electron-probe X-ray micro-analyser. Since such apparatus will not be immediately available, consideration has been given to other methods of measuring microsegregation. The problem has no easy solution, and some preliminary work on indirect methods of assessment has been carried out. In this connection a metallographic technique involving a study of the differing transformation characteristics of the dendrite spines and dendritic interstices shows some promise. To gain a fundamental understanding of segregation on a micro scale, pure binary and ternary alloys will be studied.

The ultimate object of this investigation is the development of casting compositions with superior properties, particularly when heat-treated to high tensile levels. Since a wrought steel composition exhibiting many favourable properties has already been developed at A.R.D.E., work has commenced on examining the suitability of this steel as a casting composition. This phase of the project is being carried out under contract from the War Office.

Plant Engineering

Sand Reclamation

The Association has carried out trials of sand reclamation by a dry pneumatic unit and by three wet methods. Normal laboratory tests and casting trials have been made with sands scrubbed to a very low clay content of about 0.1 per cent. and with reclaimed sands containing up to 3 per cent. clay. Both gave equally good results. This suggests that a very high degree of cleanness may not be required in all cases and that a certain amount of residual clay may be tolerated. Subsequently, work was initiated to find out the degree of sand cleanness required for typical foundry applications.

During this investigation it became evident that the standard test for determining clay content may give inaccurate results when applied to used or reclaimed foundry sands, which contain live as well as dead clay. The A.F.S. clay test is a particle size differentiation and does not distinguish between clay, sand, or carbonaceous material, provided all three are below a certain critical size value. A colorimetric method has now been developed by means of which live clay may be quickly and accurately determined in unit sands containing both live and dead clay. By means of this method, the live clay

* JOURNAL, July 21, p. 71 *et seq.*

content is assessed by the iron exchange between nickel sulphate solution and the clay, the amount of nickel absorbed on the surfaces of the clay being a direct measure of the amount of live clay present.

Work is at present in hand to develop a technique by which the total amount of clay can be accurately determined. Once this is achieved, it will be possible to find out the amount of dead clay as the difference between the total amount of clay and the live clay content. In considering the economies of the wet reclamation methods, the problem of sand drying after scrubbing and the disposal of the wash water must be taken into account. Information obtained from several manufacturers of drying equipment indicated that the cost of drying would be of the order of 5s. to 10s. per ton. Problems relating to the disposal of effluent water after wet reclamation are also being examined.

Moulding-sand Compaction and Moulding Machines

An investigation of the performance of three different moulding machines yielded information on the effect of the machine variables on the compaction of moulding sand and some practical recommendations were included in a paper summarising this work which was presented at the Association's annual conference held at Harrogate in October, 1959.

An examination has also been made of the effect of squeeze pressures exceeding the pressures available on jolt-squeeze moulding machines. These tests have indicated that in order to obtain very high compaction and mould-hardness figures, it is necessary to use a sand mix with exceptionally high green-strength (20 lb. per sq. in.) containing 10 per cent. clay, and 3 per cent. water. Over the squeeze pressure range used, *i.e.*, from 100 to 500 lb. per sq. in., and in all mould positions, this mix gave hardness values superior to those of conventional mixes (5 per cent. clay, 3 per cent. water, 7 lb. per sq. in. green strength), in some instances by some 10 to 15 points.

A study of a more fundamental nature of sand compaction in relation to the sand variable, such as the grading of sand, composition and amount of clay bond and other additives to the sand, is now in hand.

Efficiency of Shotblasting

The testing machine, constructed at the Research Station and previously described, has been used to examine the cleaning properties, relative life and wear of impeller blades with 18 samples of abrasives. The results of tests so far indicate that chilled cast-iron grit has the fastest cleaning rate, followed by malleable-iron grit, steel cut wire pellets and steel shot. These rates are averages over the whole life of each abrasive, taken to the same degree of breakdown. The wear on 25 per cent. C. cast-steel parts of the testing machine was least with steel and greater with malleable iron grit, steel cut wire pellets and chilled-iron grit, in that order. The life of steel cut wire pellets was observed to be about 60 times that of malleable-iron grit and 4 times that of steel shot.

The results of these tests have been compared with the physical properties of the samples, previously examined, and it appears that for cut wire pellets higher hardness is associated with longer life and higher cleaning rates. For chilled cast iron abrasives, however, relative life appeared to be dependent on particle size only, smaller grades lasting longer, and cleaning rates were highest at a particular size grade, decreasing with larger and smaller grades.

For future work, the machine has been modified to provide more detailed information on the relationship between physical properties of abrasives and their efficiency. Briefly, the modification results in a sample of stabilized size distribution being tested, whereas formerly the size of the abrasive particles decreased during the test. This improved method, now in use, simulates more closely the conditions in a full size plant. Attention is now being concentrated mainly on steel cut wire pellets and steel shot and attempts are being made to obtain supplies of each with controlled variations in physical properties. The effects of these variations on the efficiency will then be studied more closely.

The examination, in the testing machine, of wear-resistent materials commercially used for parts of blast-cleaning equipment has indicated that white

The high-temperature tube furnace (shown on the right) is platinum wound and temperatures of 1,500 deg. C. can be reached. Samples of steel being heated to temperatures of this order need to be protected from oxidation, and this is done by flowing an inert gas through the tube in which the specimen is placed. In the illustration the temperature of the specimen is being measured by a separate potentiometer (centre). This furnace has many uses, but is adapted in the BSCRA laboratories primarily for diffusion experiments in the study of micro-segregation in cast steels.

Properties of various types of shotblast abrasives can be determined and compared from the test results obtained in this machine, which was constructed in the workshop of the British Steel Castings Research Association.

cast irons of high nickel-content were superior to high-chromium cast irons and both were superior to plain white irons. Tests on further materials are continuing and yet further improvements to the testing machine should provide more detailed results.

Atmospheric Pollution from Steelmaking Processes

Investigations have been conducted in the Association's laboratories on the emission of fume during oxygen lancing in the 6-cwt. capacity Junkers furnace and tests are being made of the performance of pilot-plant collectors when handling fume. Tests on two types of collector of novel design have been completed.

Measurements have been made in the works of member companies of fumes produced during complete melts in four electric-arc furnaces ranging from 1.5 to 80 tons capacity and in Tropenas converters of 1.5 tons capacity. On three of these electric-furnace installations, fumes were passed through dust collectors before being descharged into the atmosphere. The efficiencies of the collectors on these furnaces were also assessed at various stages of the steelmaking process.

The results of these measurements show that, for basic electric-arc furnaces in which carbon steel is made by the double-slag process and in which oxygen is injected, the total emission is remarkably constant over a range of furnace capacities from 3 tons to 80 tons and is approximately 5 lb. per ton of steel melted.

The average stack loadings during the melt-down and refining periods are normally below 0.1 gr. per cub. ft. out during oxygen lancing 0.39 to 0.71 gr. per cu. ft., the highest individual value being 1.02 gr. per cu. ft.

The total emission from Tropenas converters is of the order of 25 lb. per ton of steel melted. Further work is in progress on Tropenas converters to assess size distribution and the variations of the quantity of the fume during a complete melt.

It has been suggested that an acceptable level of discharge from arc furnaces might be defined on the basis of the degree of optical obscuration caused by the emission. Before introducing such a standard it is necessary to establish a correlation between the gravimetric fume loading in gr. per cub. ft. and the optical observation, and measurements are being carried out at the Association's laboratories in order to obtain these data.

Industrial Health

Assessment of Atmospheric Dust in Foundries

Since the completion of the survey of the dust concentration in foundries some 2 years ago, the Association has been asked by several member companies to repeat the measurements in order to check whether any change in the level of the atmospheric dust concentration can be detected as a result of the installation of new dust-control equipment. A number of member companies have purchased Hexhlet instruments and are making measurements and assessments of samples in their own laboratories; the Association has assisted these members by determining the amount of free silica present in the samples by the X-ray diffraction method.

Because of a transfer of the effort of the team engaged on dust problems to measurements of fume emission from steelmaking processes, it has been necessary to delay the study of the characteristics of the dust produced by individual foundry processes and their contribution to overall dust concentrations.

Efficiency of Dust Collectors

The collection efficiency of a wet scrubber on electric-furnace fumes has been assessed. The results have shown that depending on the load (in gr. per cub. ft.) the efficiency figures varied within very wide limits and for a typical emission during melt-down, the efficiency was 75 per cent. maximum, while during oxygen lancing, it did not exceed 59 per cent. Similar performance on electric-furnace fumes was shown by a pilot-plant dry type of collector, in which the filtering bed consists of mineral grit. Sampling has also been carried out in a member foundry on two wet-collector installations collecting dust from a shotblast unit and a sand-preparation plant.

Dust Control on Portable Fettling Tools

Experimental work at the Research Station has resulted in the development of a fettling bench* which provides a highly efficient control of dust

* British Patent Application No. 5725 59.

generated during the fettling of light castings and, at the same time, leads to a substantial reduction of the noise pressure level. The basic principles of design have been worked out in such a way that they can be applied to both circular and rectangular benches. A protoype bench has been subjected to trials in a fettling shop over a lengthy period and has proved satisfactory. Licensing arrangements have been made with two manufacturers—Spencer & Halstead, Limited, Ossett, Yorkshire, and Newton Collins, Limited, Birmingham—for the commercial production of benches to this basic design.

Noise Abatement in Foundries

Preliminary plans have been made for the construction, at the Research Station, of an enclosure in which methods of noise reduction will be demonstrated. Promising results have been obtained in reducing the noise from the exhaust ports of pneumatic hammers. By directing the exhaust air through a flexible hose into a silencer, the noise associated with the exhaust is reduced without reducing the hammer efficiency. With some types of castings the main source of noise is the vibration of the casting itself during the dressing operation with a pneumatic hammer. Tests have shown that this vibration can be considerably reduced by using clamps on such castings.

Silicosis Hazards in Steelfoundries

A series of animal experiments is being conducted at Reading University under the direction of Dr. P. F. Holt to determine whether there is an aggravated hazard to health resulting from the CO_2/sodium-silicate bonding process for foundry sands. This work is supported jointly by the Association and by I.C.I. Limited. Batches of rats were subjected to comparable dust-concentrations generated from normal bentonite-bonded sand and from CO_2/sodium-silicate bonded sand, the dust in both cases being generated from sand strip extracted from moulds immediately in contact with the casting surface. After exposure, the development of silicotic tissue in the lungs is studied over periods of up to 6 months. Although no final conclusion can yet be drawn, it does not appear that there is any marked difference in the fibrogenic activity of the two types of dust.

Non-destructive Testing

Ultrasonic Examination of Steel Castings

Work at the Research Station under contract from the War Office on this subject is now in its second year. This has been concerned with an assessment of the sensitivity of the method for the detection of internal defects in castings and the variables studied have included the effects of composition, heat-treatment, surface condition and the frequency of the ultrasonic pulses. A comparison has been made between the sensitivity with normal surface application of the probes and with immersion in water. The results have been very encouraging and it is thought that there is considerable scope for this method of non-destructive examination in many steelfoundries. It is hoped, with War Office approval, to release the results of this work to members of the Association in the near future and to demonstrate the technique in member foundries.

The report is signed on behalf of the Council by Dr. R. Hunter (chairman), and Dr. A. H. Sully (director of research).

House Organs

Tin and its Uses, No. 49. Published by the Tin Research Institute, Fraser Road, Greenford, Middlesex.

This issue contains an interesting article about two instances of gunmetal to withstand sea-water which were reported from Sweden. Both items were guns which had rested on the sea bottom near Stockholm for long periods; one gun from the warship "Riksnyckeln" had been cast in 1535 and had been under the sea since 1628 when the ship foundered. It was salvaged in 1920. The other gun was on the warship "Wasa" which sank on its maiden voyage from Stockholm, also in the year 1628. This was brought to the surface in 1958, after 330 years' immersion. In the Riksnyckeln gun, vague dendrites were present, but in the Wasa gun, not a trace of dendritic structure could be detected. The corrosion rate seems to have been less than 0.0002 in. per year.

Foseco Foundry Developments, No. 6. Issued by Foundry Services International, Limited, Long Acre, Nechells, Birmingham, 7.

This issue contains four papers—"Hydrogen in Steel," "Degassing Copper-base Alloys," "Effect of Degassing Treatment on the Sodium Content of Aluminium/Silicon Alloys," and "Refinement of Hyper-eutectic Aluminium/Silicon Alloys," all emanating from the staff of the company's research laboratories. Some of the research is to aid the production department of the company in the making of briquetted material, through the use of which foundries can simplify their production processes, with the assurance of adhering to scientific principles. The articles are well written and contain much useful information.

The Forge, No. 11. Published by J. Brockhouse & Company, Limited, 25, Hanover Square, London, W.1.

Since its inception, this magazine has had its make-up largely changed from publishing articles on "how we produce our goods" to "where our products are going." From a sales propaganda point of view, this is the more direct, but the earlier form which tends to instil confidence should still have a place. This issue is very interesting and covers a remarkably wide range of products and includes such diverse items as school buildings, tennis posts and steel castings for the yokes and bearing cups of aerial stay insulators.

Cobalt, No. 7. Published by the *Centre d'Information du Cobalt*, 35, rue des Colonies, Brussels, 1, Belgium.

The information contained in this well-presented *Journal* is very largely a collection of original researches carried out in the various laboratories of the Battelle Memorial Institute. From the foundry angle, cobalt is of real interest to the makers of magnets and is beginning to be used in certain precision castings. For foundry laboratories, the magazine is an ideal medium for keeping *au courant* of developments in this field.

Rating of Plant and Machinery

By an Industrial-law Correspondent

A rating expert examines the new Plant and Machinery (Rating) Order which came into effect recently, and poses the question: How is this going to affect *your* rate liability? It will quickly be realized that much of the subject-matter is directly applicable to foundries.

Fundamentally, both foundry and other industrial properties are assessed to rates according to their yearly rental value. The question is: What rent would a tenant pay for the whole property, as it stands, if it were vacant and to let? The property consists of land, buildings and any *rateable* plant and machinery installed. Non-rateable plant and machinery must be ignored. For it to be rateable, it must first of all *be* plant and machinery—mere loose tools and loose machines will not be taken into account. Secondly, it must be mentioned in the Order. This applies to all types of property—factories, workshops, warehouses, etc.—except those which are usually valued by reference to the accounts, *e.g.*, public utilities, radio relay undertakings and the like, where special rules apply.

The form of the new Order, like its predecessor, follows the form laid down in the third schedule to the Rating and Valuation Act, 1925. As a very rough line of demarcation:

(1) Any plant or machinery which is there for the benefit, as it were, of the property itself, *i.e.*, supplying power to it or heating, cooling, ventilating, lighting, draining or supplying water to it, or protecting it from fire, or any plant or machinery which is itself a building or structure, is rateable.

(2) Any plant or machinery which is there for the manufacturing process, is not rateable.

Electrical Power

The Ritson Committee recently reported that it had been represented to them that in certain circumstances electrical power was rated more severely than other forms of power. They agreed with these representations, and recommended changes to remedy the injustice. Under the old Order, electrical-power plant was rateable up to and including the main distribution board (or boards). In a complex system, however, the question arises: Which is the main distribution board? Under a decision of the Court of Appeal, in 1944, where power is used at various voltages and in various forms it was held that all the boards were rateable (with, of course, the associated installation of cables, switchgear transformers, rectifiers, etc.), down to the last board in each circuit where the voltage was the same as that used by the process machinery.

The new Order, whilst not exactly reproducing the Ritson Committee's recommendation, has changed this. In future, electric power is rateable up to and including the first transformer in any circuit, or if the transformer precedes a distribution board or there is no transformer, up to the first distribution board. This last provision is unfortunately not very clear. Often, distribution boards precede transformers instead of the other way round, and if for example there is first an h.-t. distribution panel, so that some of the current is taken off to a transformer whilst the rest goes to another board from which it is fed direct to three-phase motors, the question for the valuers and lawyers—not to mention the man who pays the rates—is whether the second distribution board is rateable or not. On an extensive site the length of cable involved and the high cost of distribution boards can make the question of some importance.

When a Transformer is Not a Transformer!

Although an electric installation is rateable up to the first transformer in any circuit, this does not mean a "transformer" in the electrical sense. The word is defined in the Order to include any apparatus which changes the pressure, frequency or form of current. It would therefore include rectifiers, rotary converters and the like. There is also a proviso that the term transformer does not include any plant which forms an *integral part* of any plant which is there for manufacturing operations or trade processes. Presumably, therefore, "built in" transformers, rectifiers, etc., will escape rateability. Manufacturers, please note!

Structural Plant

For a number of years there has been controversy and litigation regarding what is called class 4 plant—that is to say, plant and machinery which is (or is in the nature of) a building or structure. If any plant or machinery of that kind is named in the Order, it is rateable. That is all very well—always assuming that one can distinguish between what is really a structure and what is not. There is no definition of a building or structure and, in the end, the question will be a matter for the courts to decide. The decision will usually rest with the Lands Tribunal, because that is the final tribunal of fact. If, after hearing the evidence, and usually inspecting the plant in dispute, the Lands Tribunal decide that it is a structure or is in the nature of a structure (and therefore rateable), this decision will not be reversed by the higher courts, unless it can be shown that the Tribunal has misdirected itself on a point of law or has applied the wrong tests in reaching its decision.

Rating of Plant and Machinery

The courts have, however, laid down certain tests to serve as guides in deciding whether or not a certain piece of plant or machinery is a building or structure. In a case involving furnaces at a steelworks, Mr. Justice Jenkins (as he then was) suggested five tests. In outline they are:

(1) Is the item of plant built or constructed on the site, or is it brought there in one piece without a major feat of engineering being carried out to get it there?

(2) Is it of substantial size?

(3) Is it permanent and intended to remain in one place?

(4) Is it removable only by pulling down or taking to pieces?

(5) Is it physically attached to the premises?

None of these tests is really conclusive, but together they help to decide the question.

Moving Parts

An item of plant may still be a structure even though some of its parts may be movable. Thus a windmill or a turntable is a structure and, in the steelworks case mentioned above, tilting furnaces were held to be structures. Similarly, in later cases rotary kilns and coolers in cement works have been held to be structures, and thus to be rateable. In these cases the courts have tended to consider the *function* of the apparatus in deciding whether the moving parts of an item of plant were rateable in addition to the fixed parts. If the main item is a structure, the courts hold that all the associated plant which is functionally inseparable must be included, and rated.

Recently a case came before the courts involving bakers' ovens. Such ovens had been held to be rateable in an earlier case, but now the question concerned endless belts and machinery for passing the dough through ovens, and through "provers" in preparation for baking. This time the decision appears to have tended the other way—in favour of the ratepayer. The Court of Appeal held that the real test was whether the associated items (*i.e.*, the belts and conveyors) were part of the plant from a *structural* point of view—not, or not only, because they were part of it from a functional aspect. In this particular case the Lands Tribunal held that the moving parts were not rateable, and the Court of Appeal thought they were right in so holding. There was evidence that the conveyors and machinery could be removed and that, in theory, the ovens and "provers" would still remain capable of functioning as such although, of course, it would not be economically practicable to use them without the trays and conveyors.

Plant that moves as a Whole

A majority of the Ritson Committee thought that all plant which moves as a whole—even if it were massive enough to be considered to be a structure—should be exempted from rating. The Minister was not prepared to accept this recommendation, however, as he was advised that it would be contrary to the principles laid down in the 1925 Act. It may be noted, however, that "conveyor, crane and transporter gantries" have been omitted from the new Order, although fixed gantries (under foundations and settings for plant and machinery) remain.

New Wording

The heading to the list of structural plant in the new Order has been turned round into the negative form. In the 1927 Order the "parts of a plant or combination of plant and machinery" were rateable whenever and only to such extent as they were a building or structure. In the 1960 Order the "items" of plant are rateable except (*a*) when they are not a building or structure, and except (*b*) any part which does not form an integral part of such item as a building or structure. It is not certain that this changed form will make any real difference, except that it was evidently framed with the baker's oven case in mind.

It will probably be desirable for ratepayers who have plant corresponding to items named in the Order, and which may be considered to be structural, to consider, if it has moving parts, whether those parts have been and should be rateable. It is open to a ratepayer to demand from the Valuation Officer details of the rateable plant which has been included in his assessment, but in many cases it would be better to seek professional advice.

Valuation of Plant

When plant or machinery is rateable its annual rental value has to be estimated and, in most cases, that value is added to the assessment. It must be remembered, however, that the assessment of the hereditament is the rental value of land, buildings and rateable plant looked at as a whole. Thus the difference between the value of a property with a passenger lift, and the value of one without a lift, may bear little relationship to the value (looked at from the point of view of cost of installation) of the lift itself. With this reservation, however, it is customary for the annual value of rateable plant and machinery to be estimated by taking a percentage (perhaps six per cent.) on the capital value of the item. For new plant the capital value will be the cost plus the cost of installation, but for old plant some allowance is made for age and obsolescence.

Conclusions

To sum up, the possible effect of the Plant and Machinery Order is likely to be most marked (*a*) in premises where electrical power is used extensively, and (*b*) where there is structural plant with moving parts. In such cases it may be possible to claim some reduction in the assessment because of the new Order. In some cases assessments may be increased to take account of new items added to the list of rateable plant. In Class I (*a*) of the Order (dealing with power plant), the only addition is that of gas turbines. All the other additions are in Class 4, that is the structural class (rateable only if they are structural). A list of these

(*Continued on facing page, foot of col.* 1)

New Foundry for Heathcoat Group

At noon on Tuesday, July 19, the foundation-stone of the new iron foundry being erected at Lowman Works, Tiverton, was laid by Sir John Heathcoat-Amory, Bart., chairman of the Heathcoat group, of which Exeleigh Foundry, Limited, is a subsidiary. The foundry which has operated for some 150 years at the textile factory of John Heathcoat & Company, Limited, Tiverton, serves the engineering subsidiaries, Stenners of Tiverton, Limited (manufacturers of sawmilling machinery) and E. V. Twose (Manufacturing), Limited (manufacturers of agricultural and public works machinery) as well as catering for the needs of the parent company and a number of outside firms. The inscription on the foundation stone reads: "To mark the transfer of the foundry from the Heathcoat factory where it operated for about 150 years. This stone was laid by Sir John Heathcoat Amory, Bt., chairman of the Heathcoat Group, July 19, 1960.

The transfer to a new site having been necessitated by the expansion of the textile factory, the opportunity has been taken to design a self-contained, compact foundry on modern lines, advice on the layout having been obtained from the Cast Iron Research Association.

The foundry will comprise three main sections—the foundry itself, with cupola bay, pattern-stores, and coreshop adjoining; a roofed store for raw materials, and a covered castings stockyard. The main single-span building will be of the tied portal-type, measuring 150 by 40 by 20 ft. high to the eaves. It will be equipped with a 2-ton overhead electric traversing crane, running the full length. A lean-to, housing the ancillary departments, will be 20-ft. wide along the length of one side and at one end will be a fettling shop 40-ft. wide by 30-ft. long. The pattern section will be two-storeyed. Roofs and top portions of the walls will be of asbestos-cement sheets, but on the Elmore recreation ground side, the block walls will be faced with brick.

Plant to be installed will include a Jackman No. 2½ cupola, which will be fed by a quick-acting mechanical skip charger, operated by push-button. There will be three moulding machines, two of the jolt/rollover type and one a jolt/strip machine. Heating of the main shop will be by an oil-fired hot-air heater and another oil-fired unit will heat water for the washroom, which will incorporate a wash-fountain and showerbaths.

Personnel and Administration

The foundry will have a capacity of about 700 tons per year and will employ between 25 and 30 men, who will transfer to the new building about the middle of September. The foundry superintendent will be Mr. George Hancock, who originally served his apprenticeship in the Stenner foundry and has been in charge of the Exeleigh Foundry since 1939.

The foundry company will become part of the engineering division of the Heathcoat group, of which the managing director is Mr. W. P. Authers. Mr. E. W. Nott, director of Exeleigh Foundry, Limited, and assistant general manager to John Heathcoat & Company, Limited, will continue to act in an advisory capacity.

The technical supervision will be carried out by Mr. R. J. Piercey, A.M.I.MECH.E., works manager and chief designer to Stenners of Tiverton, Limited. He has been responsible for the design of the new foundry and co-ordination of the project, assisted by Mr. P. Carter (Stenner drawing office).

Entrance: A new entrance-road to the foundry will be built to connect with a new bridge over the River Lowman and give access into Blundells Road, Tiverton, with a view to easing traffic congestion in the Lowman Green area.

Contractors: For buildings, structure and sheeting: Sanders & Forster, Limited, of London; for building work and roadworks: C. P. Unwin & Sons, Limited, Tiverton; for the floor over the pattern-store: Devon Concrete Works, Limited, of Barnstaple, and cupola, skiphoist and moulding machines: J. W. Jackman & Company, Limited.

(Continued from adjoining page)

additions is given for reference below.

New items, rateable only if they are structural: Aerial ropeways, supports for; funnels (added to bins and hoppers); boilers; bridges (internal); Bessemer converters vessels and containers for various processes (added to chambers)—the list of these processes is increased by the addition of: diffusion of gases, mixing, shotblasting and testing; coolers, chillers and quenchers; heat exchangers, recuperators and regenerators; filters and separators; (the processes for which "Pits Beds and Bays" are used have had "acid neutralizing" added); precipitators; reactors; tipplers; ("columns" have been added to "towers" for various chemical and cooling processes); walkways, stairways, handrails and catwalks, and well casings and liners.

Steelworks for Persia

Agreement valued at about £70,000,000 for an Anglo-German consortium to build a large steelworks at Azna, northern Persia, has been signed. British partner in the deal is the Metallurgical Equipment Export Company, Limited (MEECO), and members taking part are Simon-Carves, Limited, the Electric Furnace Company, Limited, and the Wellman Smith Owen Engineering Corporation, Limited. Taylor Woodrow Construction, Limited, is also associated with the project. Besides the steelworks, which will have an annual capacity of 300,000 tons, the project includes an iron-ore mine and a town for 10,000 inhabitants. MEECO will be responsible for about one third of the deliveries to Azna.

Equipment and Supplies

Blast-cleaning Unit

A self-contained portable blast-cleaning unit, known as the Educt-o-Matic, is now being produced by Hodge Clemco, Limited, Darnall Road, Sheffield, 9. The machine, which weighs 7 lb., contains its own vacuum pick-up and dust-extraction unit so that the only connection required is an airline. This should be ¾-in. internal diameter, supplying 33 to 60 cu. ft. per min. at a pressure of 90 to 100 lb. per sq. in. There are no electrical connections.

The abrasive is continuously recirculated and a full charge of 4 lb. will normally blast for 15 to 40 min. according to the skill of the operator. Compressed air sucks the abrasive from its container into a venturi-type nozzle which blasts the air/abrasive mixture spreading it over the area enclosed by a rubber boot, giving a blast pattern 1- to 1½-in. dia. A vacuum picks up the abrasive with the material blasted from the surface and passes them to a small cyclone where they are separated. The removed material is blown into a dust-bag for later disposal.

Rod- and Tube-bending Machine

Chamberlain Industries, Limited, of Staffa Works, Argall Avenue, Leyton, London, E.10, report the addition of "Herber" hand-operated bending machines. Operated on the principle of the internal mandrel, it is reported that short radius and "S" bends can be produced quickly and simply whilst the machines can be set for right-hand and left-hand bending. All parts liable to wear are made of steel and hardened, adjustment is simple and the bending head and frame are made from castings throughout. These machines are said to be suitable for bending thin-walled tube from ¼ to 1¼-in. dia. and, presumably, core rods also can be shaped, but to a smaller maximum diameter.

Coating Resin

Bakelite, Limited, has developed a solventless liquid epoxide resin/hardener system which will provide a coating of up to 0.010-0.015 in. thick in one application, thereby eliminating the need, it is stated, for costly multiple coats. Such coatings are claimed to be ideally suited for application to structure steelwork, most metals, wood and concrete. Full details of this development are contained in Information Sheet E.37, copies of which are available, free of charge, upon application to Bakelite, Limited, 12-18 Grosvenor Gardens, London, S.W.1.

Curing Agent for Resins

Shell Chemical Company, Limited, announce the addition of a new room-temperature curing agent, "Epikure" RTL, to their range of curing agents for liquid "Epikote" resins. The agent has been specially developed for use with resin types 828 and 815, for the production of glass-fibre reinforced laminates which, it is claimed have excellent mechanical and chemical resistant properties. A feature of the new curing agent is stated to be its low viscosity, a property which gives improved handling characteristics.

Transistor Technique

A new way of using a symmetrical transistor—as a chopper—has been developed by Smiths Aviation Division, Kelvin House, Wembley Park Drive, Wembley, Middlesex, principally for use with thermocouples. The company also visualizes the use of its transistor/chopper technique in strain-gauge work.

Service Contract: A new after-sales service scheme for their lifting magnets is announced by Rapid Magnetic, Limited, Lombard Street, Birmingham, 12. Known as a service contract, the scheme provides for visits at agreed intervals of qualified engineers for the purpose of ensuring that proper maintenance is arranged.

Slotted-angle used to build-up Handling Devices

The illustration alongside shows roller-conveyor and ball tables —using standard ball castors and slotted angle—designed by a Reading firm to overcome the problem of feeding heavy castings into a grinding machine. When using a grinder it was found inconvenient continually to remove castings for checking so it was decided to put them into fixtures which were pre-set. The main case casting weighed 56 lb. and its fixture another 112 lb. so that manual lifting was out of the question. At the same time an installation was needed that could be cleared away to make room for the handling of smaller castings.*

*Made by Dexion, Limited, Maygrove Road, London, N.W.6.

Association of Bronze & Brass Founders

Proceedings of London-area Meeting held on July 7

The first item discussed at the London-area meeting of the Association of Bronze & Brass Founders held on July 7 at the Gore Hotel, Kensington, concerned the recently-held European Foundry Apprentices' Competition, and appreciation was expressed to Mr. G. H. Charsley, managing director of Trent Foundries, Limited, and an ABBF Council member, for the work he had done to ensure that the competition would be a success. Mr. Charsley had made a report to the president of the ABBF on the competition and his views were considered to be of such importance that they were read out to the meeting.

European Apprentice Competition

At the commencement of his report, Mr. Charsley emphasized the vast amount of work and expense involved in running the competition. He felt that this should be stressed at the outset as far too many people were apathetic and the organization of the competition had been left to a very few firms and individuals to "give their all," to arrange what was after all a national competition and highly important to this country.

Turning to the results obtained by the British entrants, he said that in the main these were the best results to date and a big improvement on previous similar competitions. However, Mr. Charsley added a word of warning—there was not, he said, any signs of a great uplift in the standard of foundry apprentices in general in the country, particularly in connection with the practical side of foundrywork. Many aspects needed to be considered and Mr. Charsley said that he was continually forced back to the conclusion that the weakness in ensuring good apprentices in the foundry industry was largely due to methods of training, wherever they might exist.

The method of selecting the three boys to represent Great Britain in the competition was placed in the hands of the Institute of British Foundrymen, and this body obtained an entry of some 44 young men from the whole of Great Britain. These, in turn, sat for an examination in theory, calculation and drawing and from the results, 14 boys were singled out to go on for practical work. At this point, Mr. Charsley continued, the first weaknesses became apparent; the vast majority of the young men were of a low standard in written work and therefore it was concluded they would stand no chance against their overseas rivals. This country was fortunate this year in finding three apprentices who were good in this respect and in particular, two were exceptional insomuch as they obtained first places in both theory and calculation.

Practical Test

Passing on to the practical test, Mr. Charsley said he had mixed feelings. He had been one of the judges for the "steel" section, and was very disappointed in the young men's approach to the test. Time did not seem to matter and their methods of going about the job seemed more academic than practical; and after getting to know more about the apprentices taking part, he found they were engaged on work more of a theoretical nature than the actual making of moulds. Surely, this pointed to a weakness in training methods—insufficient practical work was being done along with written work.

Dealing with the apprentice entered for the non-ferrous section and those for the cast-iron section, in general Mr. Charsley thought they were a much better group than those entered the previous year and he had had great hopes of success. He felt that the reserve young man was as good as any in the practical work, but was a long way behind the three boys who finally represented Great Britain in the written work—this again "highlighted" the need for the two branches to run together.

Mr. Charsley analysed the work of the young man representing the non-ferrous section as an example, and said that on merit this young man looked like being this country's strongest candidate for first place in the competition, but when he got to know him, he was surprised to learn of his lack of certain fundamentals concerned with the making of a mould. In the actual competition, this young man did everything expected of him in the written work, but did not produce a 100 per cent. casting. He made two or three very elementary mistakes which almost lost him his casting and dropped too many marks—and, incidentally cost him his chance of first position. He had analysed the work of this young man to draw attention to the fact that in the old foundry "craft"-shops, these mistakes would have been corrected even at 15 or 16 years of age. Mr. Charsley asked the question "Does not this seem farcical for a candidate to be brilliant on paper and unable to apply the theory to the sand?" Again, in the practical test, he felt that the following fact should be brought to notice—out of 12 young men who made the test-casting in iron, only one had produced a good casting and this was the Swedish entrant; Mr. Charsley said it must also be borne in mind that these young men were in fact the pick of Europe!

Future Outlook

Finally, Mr. Charsley said that he was not intending to be super-critical, but such observations needed to be made if only to cause some serious thinking in the industry and in order to find a happy solution to the many problems which existed at the moment in ensuring a better supply of craftsmen in the foundry industry. The speaker said he was willing to answer any points that any-

one might raise with regard to the competition and finally concluded by stating that the committee who organized the competition would be pleased to make available patterns and coreboxes that were used in the practical test for local competitions, should anyone feel inclined to run one.

Agenda Continued

This concluded the first item of the agenda and points which arose out of the discussion of item three, the promotion and use of copper-alloy castings (which was next dealt with at the meeting) were: (1) The importance for founders of reaching the *designer* of engineering parts, so as to ensure that any castings which he had to incorporate in his product were properly designed for casting and that the correct grade of material was specified for any particular job. It was added that the provision of a manual on the design of bronze and brass castings, written by experts and sponsored by the ABBF, would be an invaluable aid to the promotion of the use of copper-base castings. (2) The high price and fluctuations in prices of copper were cited as having a strongly deterrent effect on the adoption of copper-base castings. It was pointed out that other and competitive materials were much more stable in price-structure and this contributed to their development at the expense of castings sales. (3) The value of founders exhibiting at engineering exhibitions was stressed and it was decided this should be carefully considered for future policy. The final point discussed under this item was that those with like interests, *i.e.*, the ABBF and the ingot manufacturers supplying non-ferrous metals to founders should run a joint publicity campaign to further the use of copper-base castings.

Considering, in relation to the promotion of the use of copper-base castings, the two final items of the agenda, *i.e.*, the development of the ABBF and finance, comments raised were that these three items were all inter-connected and were of the greatest importance to the whole non-ferrous industry. When the Association first considered promoting the use of copper-base castings, business was slack; now the industry was reasonably busy, said the chairman, Mr. W. R. Buxton, but it should not be "hoodwinked" by this seeming busyness. Unless the industry faced up to the competition of fabrications, light-alloy fabrications, plastics, and other materials, it would find itself with little work to do. Hence, three things were put forward which ought to be done, namely, (*a*) money should be spent in building up a "live" Association in order to (*b*) improve the products of members and the scope of the industry and (*c*) to publicize in the correct manner, by giving the engineer and designer every possible incentive to use bronze and brass castings. Under the heading of "finance," it was reported that in France, foundries had the benefit of a ¼ per cent. levy on castings sold. In this country, there was a levy on pig-iron used in the ironfoundry industry which went partly towards research, and the question was posed whether a similar levy could not be made on non-ferrous ingots and/or copper. The introduction of such a levy would mean that all copper-base founders would pay something towards research and development rather than members of the ABBF only, and this research would, of couse, be carried out for the benefit of the industry as a whole. If instead a levy were made on castings sales, it would only be feasible to collect it on castings sold by Association members but the research results would accrue for the general good—which was not fair. On the subject of improved products and facilities offered by the Association, it was felt by members present that these should include a booklet on the design of castings, as put forward earlier and, further, continued investigation of new methods of production and improved grades of alloys should be carried out. The possibility of combined membership of the ABBF and the British Non-Ferrous Metals Research Association was also discussed.

Passing on to publicity for the industry, it was decided that this could best be carried out by a full-time public-relations organization and should include not only the Association's inter-member publicity, but Press articles, advertising at exhibitions and foundry/supplier/consumer conferences. It was realized that all the proposals put forward would cost a lot of money, but it was felt that if the founders as a whole did not apply themselves to the problem, they might just as well give up and let the industry "die on its feet."

A World-wide Problem

The problem was not confined to the UK, there were signs of it being tackled in America. Mr. F. Hudson, F.I.M., foundry consultant of the ABBF, had suggested that the Association should hold a conference comprising a symposium on raising the standard of quality in copper-base castings. It was recalled that a previous conference held by the Association at Harrogate in 1952 had proved very well worthwhile and it was felt that a further one was now due and would do much to help. This concluded the business of the meeting.

"Elizabethan Supper"

The meeting was followed after an interval with an Elizabethan supper being served to about 15 members at the Gore Hotel in Kensington. This proved quite an interesting function, both for its novelty and the spirit of camaraderie among members which it engendered. The meal was taken by candlelight, the party being seated around trestle-board tables with "serving wenches" in Elizabethan costume in attendance. Only primitive wooden plates, clay beakers, a single sharp-pointed knife and a two-pronged fork were provided, but the soup tasted just as good when drunk from its earthenware bowl and the lack of the usual array of cutlery was no deterrent to members' enjoyment of the meal. The menu consisted of such dishes as spring soup, boar's head, cucumbers in canary wine, artichoke pie, herring salad and syllabub. The finish of the meal was followed

(*Continued on p. 116, foot of col. 2*)

Notes from the Branches

South Africa

As announced in the July 7 issue of the JOURNAL, the winners of the short paper competition for the Alexander medal and prize, organized by the South African branch of the Institute of British Foundrymen, were Mr. F. C. Goldsmith and Mr. F. P. A. Robinson. As previously reported Mr. Goldsmith's paper dealt with "Chemical Treatments for Molten Aluminium," whilst "The Production of Aluminium/silicon/alloy Pistons for Petrol- and Diesel-engines" was the subject chosen by Mr. F. P. A. Robinson. He stated that considerable progress has been made in the South African aluminium-alloy-casting industry. The pistons for many petrol- and diesel-engines are manufactured locally and the product has been widely accepted by the large automobile firms, being in no way inferior to the imported engine component.

Type LM 13, British Standard 1490:1955, is the type utilized by one South African firm for pistons. This is an aluminium/silicon alloy containing copper, manganese, nickel and magnesium. One of the most striking properties of this alloy is its low contraction on solidification, and this is explained by the almost unique property of the element silicon, which actually expands on freezing. In addition the low-expansion coefficient permits close fit between piston and cylinder, and the good frictional properties due to the presence of hard-silicon particles permit extended use of this alloy for pistons.

It is the aim of producers of aluminium/silicon pistons to obtain ready-modified master alloys which can simply be remelted and cast into chill moulds without further treatment. The advent of the phosphorous-pentachloride modification process may make this possible, since it has been found in preliminary work that an almost modified structure is obtained on remelting. It is, however, necessary to ensure that degassification of the molten aluminium/silicon master alloy has been carried out with hexachloroethlene prior to the addition of the phosphorous pentachloride for maximum retention of modifier. Remelting of this modified aluminium/14 per cent. silicon alloy and casting it into pistons without any further modification is now being satisfactorily carried out on a production basis. This procedure results in an acicular eutectic, which although not quite what the theoretical metallurgist would regard as fully modified, is nevertheless acceptable as regards founding, machining and mechanical properties.

After chill casting, the pistons are subjected to an artificial ageing treatment to increase both the ultimate tensile strength and hardness. This heat-treatment procedure consists of heating the castings in a low-temperature furnace for four hours at 255 deg. C. It is interesting to observe that this precipitation treatment is not preceded by the usual solution treatment, as it has been found that sufficient of the age-hardening elements are dissolved during chill casting. In addition the precipitation treatment serves merely to harden the alloy to the extent that a good surface finish is obtained on the piston after machining. If the metal were too soft, as it is immediately after casting, the surface layers tend to flow and drag in contact with the machine-tool, producing a rough finish.

AGM and Annual Report

At the annual general meeting of the South African branch, held in Johannesburg during May, the following officers were elected for the year 1960/61: president, Mr. D. Gordon Jones; senior vice-president, Mr. J. H. Peers; junior vice-president, Mr. V. F. Williams; hon. treasurer, Mr. S. Jane, and hon. secretary, Mr. John Steele. Four vacancies on the Council were filled by Mr. W. P. Brown, Mr. P. Dyer, Dr. J. Cannon, and Dr. P. Riley.

The secretary's annual report was presented and indicated that the year 1959/60, under the presidency of Mr. K. H. Coombs, had been a year of consolidation. The highlight of the year was the official establishment of the Natal section with a membership to date of 47.

Eleven papers and two short papers were presented during the year, and of that number, only three were called for from non-members. This large number of papers to be presented by members is a tribute to the work of the papers and membership committee which meets frequently throughout the year, organizing papers as far as 18 months ahead. Unlike home branches in the UK, the South African branch meets throughout the year with the exception of the December month which is a holiday month in South Africa, being midsummer. In addition to the papers, there was a problems evening at which various members presented practical papers for discussion.

Four works visits gave the members an insight into a motor-car assembly plant, abrasive-wheel manufacture, production of domestic refrigerators and electric stoves, and finally a recently modernized iron foundry. Two social evenings and a successful dance, the first ever to be held, besides an all-day conference completed a pretty full year's programme, making a total of 17 functions for the members, and for the Council and committee members, additional council and committee meetings.

The branch and section membership records stand as follows:

	SA branch	Natal section
Subscribing firms	48	2
Honorary members	2	
Members	134	14
Associate members	123	28
Associates	23	3
Totals	330	47

Deaths of three prominent branch members were recorded during the year, the most recent being that of Mr. H. Holdsworth. "Old Harry," as he was affectionately known throughout the branch and SA foundry industry, was associated with the branch since its inception in 1937. He was branch president from 1945/46 and, in 1955 was presented with the A. H. Guy medal for his outstanding services to the branch. He was a faithful attender at branch Council meetings and always willing to play an active part in the work, indeed, a few weeks before his death he consented to give a paper in February, 1961, entitled "Fifty Years in the Foundry Industry."

Dealing with the Natal section, the report records that this section is now well established and holds bi-monthly meetings in Durban, works visits and social events. It is reported that the hon. section secretary, Mr. John Richmond, has had to resign to return to the UK because of health reasons. Tribute is paid to the sterling work done by Mr. Richmond in the establishment of the section in that area.

Two papers were prepared by branch members for presentation outside the Union. Mr. J. H. Peers prepared a paper for presentation to the Australian branch, entitled, "Largest Malleable-iron Foundry in Africa." A paper for presentation to the Institute Conference in Malvern this year had been prepared by Mr. John Steele, the subject being "Some Aspects

Notes from the Branches

of Present South African Foundry Practice."

The branch awards for the year are: A. H. Guy medal to Mr. G. F. Alexander in recognition of his services to the branch and industry in the establishment of the Foundry Sands Research Fellowship through his untiring efforts to interest the industry and obtain support for the venture. The Members' Diploma, for the best paper of the year, to Mr. John Steele for his paper on the "Moulding of a Massive Monument."

Natal Section

The May meeting of the Natal section was held under the chairmanship of the senior vice-president, Mr. A. W. Bird. There was a good attendance of members and guests to see the screening of two films and listen to the presentation, by Mr. C. Campbell, of a paper entitled, "From Stockyard to Ladle." The films dealt with the preparation of raw materials, charging and operation of the cupola.

In his paper, Mr. Campbell gave a brief historical review of man's first attempts at the melting of metal, and the subsequent evolution of the cupola. Good quality firebricks, he said, should be used for the cupola lining, and the first few feet below the charging door should be lined with cast-iron bricks to eliminate wear and tear during charging.

The furnace bottom should be rammed with low-moisture-content, high-permeability foundry sand. This should be sieved to remove any sprigs, tramp iron, matchsticks, scrap, etc., as these may cause a run-out during operation. The furnace bottom should slope from all points towards the tap hole. The author dealt in sequence with the drying of the cupola, preparation of the bed and charging. The practice of oxygen lancing, slagging and the "blow down" were also discussed.

A hearty vote of thanks to the author, who had flown down from Johannesburg to present the paper, was warmly applauded. At the conclusion of the meeting it was announced that the acting section secretary would be Mr. J. R. Walton.

Sheffield

The immediate past-president of the Sheffield branch, Mr. J. Richardson, invited members of the branch Council and past-presidents to a dinner at the Royal Victoria Hotel, on Thursday, July 7. The party of 24 included three senior officials from the Brightside Foundry & Engineering Company, Limited, Mr. Richardson's firm, who acted as hosts for the function. A general spirit of informality was preserved throughout the function at the request of Mr. Richardson. At its conclusion thanks were accorded by the new president, Mr. J. H. Pearce, and by Mr. G. Offiler, the oldest member of the Council. The latter, together with Mr. J. R. Nuttall, secretary of the Brightside concern, acted jointly in the office of director of ceremonies. The gavel fell many times during the course of the evening and each time it announced a toast or informal speech by one or other of Mr. Richardson's guests. The quality of the conversation could be described as sparkling, enlightening, occasionally elevating, but always amusing. Each man had his say and enjoyed the evening to the full, and—needless to add—all agreed with the motion, passed rather late in the evening, that future presidents of the Sheffield branch might do well to repeat such a function.

European Mechanical Handling Federation

Meetings of section IX (light lifting apparatus) of the *Fédération Européenne de la Manutention* (European Mechanical Handling Federation) were held in Stockholm on June 28, 29 and 30. The terminology was discussed and completed, as also was advice to users, and both are ready for translation into the agreed languages and will be issued when complete. Lengthy discussions took place on the factor of safety for chains, which has been the subject of a divergence of opinion during the last two meetings of section IX. A compromise was arrived at, and the safety factor was fixed at 4.2, subject only to confirmation by the French National Union.

The presiding president, Mr. Huber of Switzerland, retired after five years of office, and Mr. Stein from Munich was elected as his successor; the present vice-presidents, Mr. Verlinde, France, and Mr. Clayton, England, were confirmed in their posts. A third vice-president, Mr. Mas from Barcelona, was also elected. A future working programme was agreed upon, consisting of standardization of load hooks, wire ropes, chains, etc., and specifications were to be initiated for electric winches. Technical committees will meet as and when necessary to continue the work. The next general meeting of the section will be held in Italy during the autumn of 1962.

Rise in Stocks of Raw Materials

The Board of Trade's revised estimate of stocks held by manufacturers and distributors shows that in the first quarter of the year the increase amounted to £190,000,000, which is £13,000,000 less than was estimated provisionally. The rise in stocks of materials and fuels in the first quarter (£30,000,000) was substantially more than can be accounted for by seasonal changes.

Allowing for seasonal factors, the rise in the volume of manufacturers' stocks, at 1954 prices, was about the same as in the final quarter of 1959.

Association of Bronze & Brass Founders

(*Continued from p.* 114)

by a clay pipe of "baccy" filled for each person. Liquid refreshment, after an aperitif of mead, consisted of a rough wine served *ad lib*, but was none the worse for that. The arrangements for this out-of-the-ordinary function had been made by Mr. Buxton with the collaboration of Mr. J. P. Webster, one of the local ABBF members. Throughout the evening, the proceedings were enlivened from time to time by "hail" and "wassail" toasts drunk to new members arriving to join the assembly and not least by the rendering by Mr. Webster himself of a rollicking Elizabethan song. Members who participated were left with the feeling that there was something to be said for the "bad old days" of Elizabeth I, at least if at that time you could afford the sort of fare dispensed in Kensington.

American Letter

US Government investigates Aluminium Sales Practices

Hearings were called earlier this year by the Yates Sub-committee of (American) Congress to discuss the aluminium industry, and these centred around hot-metal contracts and the rising volume of exports of aluminium scrap from America to other countries. Mr. R. E. Kellers, representing the American Die Casting Institute, described the hot-metal contracts between the primary producers and the motorcar manufacturers as a form of discriminatory pricing. This was leading to an increase in not only hot-metal use but a loss of markets by the custom die-caster to the "captive" foundries. In 1955, he said that more than 70 per cent. of aluminium die-castings used for the manufacture of motorcars was purchased from custom die-casters, but in 1959, the custom foundries' share of the motorcar castings market had shrunk to less than 89 per cent.

Speaking for the smelting (secondary aluminium) industry, Mr. C. R. Burton (secretary of the Aluminium Smelters Research Institute) emphasized that the smelters were not opposed to hot-metal deals as such, only to the so-called discriminatory pricing formula and aspects. Turning to the subject of scrap, he said the industry was concerned about the supply later this year and next. Indications were that the first quarter of 1960 exports of scrap were three times those of the same quarter last year. Exports for 1960 were estimated as running at 60,000 tons or nearly double those of 1959.

The National Association of Waste Material Dealers took an opposing stand to the smelters on the subject of exports. In 1954, exports of aluminium scrap amounted to about 11 per cent. of the tonnage consumed domestically; in 1959, the total volume going abroad was equivalent to only about 7 per cent. of the domestic consumption, it was stated.

The hearings were scheduled to continue and at a later date, representatives of the motorcar manufacturers were expected to give their views.

The Commerce Department reported that the biggest customers of scrap in recent months had been Germany, Italy and Japan. Scrap requirements by these countries were expected to decline substantially by mid-year.

Experimental Aluminium Cylinder-blocks—Correction

It has been pointed out that the paragraph published in the May 26 issue of the JOURNAL, page 659, under the above heading and referring to the development of aluminium cylinder-blocks by the Chrysler Corporation of America is incorrect in regard to the number of blocks reported to be under test "on the road." The error apparently arose from an incorrect quotation of a statement by Mr. M. F. Garwood, chief engineer, materials, of the Corporation, at the American Society for Testing Materials' meeting in Cleveland. When asked if it was the intention to start manufacturing engines incorporating aluminium cylinder-blocks in the near future, he said that such was not the immediate plan, but continued by adding that if the development followed normal procedure about 10,000 such engines would be thoroughly tested in the field before mass-production was undertaken. The Editor's apologies are recorded to those who were misled by the misquotation.

Continuous Casting of Copper Alloys in Canada

Under an arrangement with J. G. Schwietzke of Düsseldorf, West Germany, Canada's first machine for the continuous casting of copper-base alloys started production in June at Roto-Cast Company, Limited, Toronto. Much of the Canadian demand for continuous-cast copper-base alloys has been supplied in the past by the USA. Roto-Cast introduced centrifugal castings into Canada some six years' ago. Whereas centrifugal casting has produced hollow lengths of bar, etc., continuous casting is used to turn out solid bars and special shapes. The continuous-casting process employed by Roto-Cast can produce round billets or flat bars up to 4-in. dia. and 10-ft. long, is capable of turning out 100 ft. per min. and can produce three shapes simultaneously of the smaller sizes. German technicians were called in to instal and operate the centrifugal-casting equipment as well as the continuous-casting machine. (Large-scale commercial continuous casting of copper-base alloys was undertaken in the US in 1948 by American Smelting & Refining Company of New Jersey.)

Corrosion is Costing £600,000,000 a Year

Corrosion in the UK is costing about £600,000,000 every year and even a slight improvement in preventive measures would represent considerable savings in materials and manpower, according to the annual report of the National Chemical Laboratory. The laboratory is making a series of tests on the corrosion of mild-steel ship's plates in estuary waters, and has also completed an investigation of the corrosion of mild-steel tubes in "Scotch" marine boilers for the British Shipbuilding Research Association.

The laboratory, reconstituted under its present name in October, 1958, has extended its work on new materials, especially studies of the development of thermally stable materials, for example, organoboron compounds. Considerable improvements have also been made in the ion-exchange process for the recovery of gold from cyanide solutions.

Steel Research Men must keep Close Watch on China

In order to keep a close watch on the developments in Communist China's rapidly growing steel industry, research workers at Sheffield steelmaking firms are to begin studying Chinese in the autumn. The scheme has been introduced at the suggestion of Mr. Robert Sewell, information officer at the Sheffield headquarters of the United Steel Companies, Limited.

Insisting that there was a lot of valuable information to be had if only British technologists understood Chinese, Mr. Sewell said that in 10 years Communist China could become one of the UK's most serious competitors in steel.

He understood that the Chinese now had automatic blast furnaces bigger and better than any in the United States and some of the Chinese open-hearth steel furnaces could process 600 tons at a time, whereas the UK's biggest took around 450 tons.

A CONTRACT has been awarded to George Cohen, Sons & Company, Limited, of the George Cohen 600 Group, for the dismantling and disposal of the plant and buildings of the former Normanby Ironworks, Middlesbrough. It is expected that dismantling will be completed within 12 months.

Personal

Mr. A. HYND has been appointed a director of the Reid Gear Company, Limited, of Linwood.

Dr. P. H. CALDERBANK has been appointed to the Chair of Chemical Technology at the University of Edinburgh.

Assistant manager of the electrical department of Harland & Wolff, Limited, Belfast, Mr. W. R. BENNETT has retired after 41 years' service.

Wolf Electric Tools, Limited, announce the appointment of Mr. HANS MÄDER as sales supervisor in Switzerland for their industrial and domestic range of power tools.

Mr. T. H. GRAY, well-known in electrical engineering circles in the area, has joined the board of Meriton Foundry, Limited, Bristol, of which Mr. J. E. ALLCOCK is chairman.

Mr. W. BRUNT has been appointed a director of Brockhouse Castings, Limited, Wednesfield, and has been succeeded as general manager by Dr. J. GRIEVE, the position vacated by Mr. Brunt.

Sir CHARLES GOODEVE is to be nominated as president-elect of the Iron and Steel Institute at its meeting in November. Sir Charles is to succeed Mr. W. F. CARTWRIGHT whose year of office terminates in May, 1961.

Mr. ISIDRO SANS DARNIS has been nominated by the *Instituto del Hierro y del Acero* (the Spanish Iron & Steel Institute), to be vice-president of the International Committee of Foundry Technical Association. He is a sub-director of the *Instituto*.

Mrs. ELLEN TREANOR, who has recently retired from Ruston & Hornsby, Limited, Lincoln, was the last of the women welders at the works. During the war the firm employed hundreds of women on men's jobs while the men were away in the Forces.

After 54 years' association with Hawthorn Leslie (Shipbuilders), Limited, Hebburn-on-Tyne (Co. Durham), Mr. THOMAS H. SMITH, commercial manager, has retired. He joined the company at the age of 13 and was secretary before becoming commercial manager.

Mr. LAWRENCE BRADLEY, a furnace attendant at John Harper & Company, Limited, Willenhall, Staffs, has been awarded £144 for an idea for the improvement in one of the company's furnaces. Mr. W. H. Harper, managing director, presented the cheque for this amount.

Mr. OMER G. VOSS, who recently returned to the United States after a period of six years as managing director of the International Harvester Company of Great Britain, Limited, has been appointed president of International Harvester in Canada, one of the largest IH subsidiaries.

Seventh in the series of annual Fawley Foundation Lectures at Southampton University will be given this year on November 10 by Sir ALEXANDER FLECK, former chairman of Imperial Chemical Industries, Limited. Title of his address: "Science and Industry: A Blend with the Humanities."

Mr. D. A. F. DONALD, chairman and managing director of the National Cash Register Company, Limited, has been appointed chairman of G. A. Harvey & Company (London), Limited. Sir THOMAS OVERY has resigned the chairmanship on medical advice but remains a director of the company.

The Rt. Hon. the VISCOUNT FALMOUTH, M.I.MECH.E., has been re-elected president of the British Internal Combustion Engine Research Association, and Professor S. J. DAVIES, C.B.E., D.SC.(ENG.), has been elected a vice-president. New members of Council are Mr. F. BLACKITH and Mr. S. J. WOOD, who succeed Mr. H. N. G. ALLEN and Mr. C. G. TANGYE.

Tube Investments, Limited, announces that Mr. W. W. HACKETT, SNR., C.B.E., on retiring from the chairmanship of Accles & Pollock, Limited, after 61 years' service with that company, which he helped to found, has accepted an invitation to become its first president. Mr. Hackett was also a founder member of Tube Investments, Limited, and served for many years as a director.

Following the David Brown Corporation's reforming of product groups, the directors of two groups have been announced: David Brown Tractors, Limited, parent company of the tractor and agricultural machinery group: Mr. DAVID BROWN, chairman and joint managing director, Mr. DAVID BROWN, JNR., joint managing director, Mr. J. THOMPSON, general manager, Mr. L. V. GALLAGHER, manufacturing, Mr. J. D. ELSTONE, marketing. Aston Martin Lagonda, Limited, parent company of the automobile group: Mr. Brown, chairman and managing director, Mr. J. WYER, general manager. Mr. Brown, jnr., Mr. Thompson and Mr. J. STIRLING have been appointed directors.

A Glasgow-born engineer, Alderman HAROLD ANDREW BENNIE GRAY, is to be honoured with the freedom of the borough of Huddersfield, his adopted home for more than 50 years. Educated at various elementary schools in Glasgow, he won a scholarship to the Royal Technical College after a period of evening study, and for a time was chief engineer with Wm. Beardmore & Company, Limited. Later he transferred his activities to Huddersfield, where he joined the staff of W. C. Holmes & Company, Limited, becoming a director of the firm in 1916. Although now an octogenarian, he still acts in a consultant capacity. He was chairman of the local St. Andrews Society in 1924 and 1925. He will receive the hon. freedom of the town of which he was mayor in 1956-57, on October 11.

Mr. H. M. HENDERSON, who is at present managing director of Unisteel Structural (Pty), Limited, of Cape Town, South Africa, has been appointed director and general manager of the Workington Iron and Steel Company branch of the United Steel Companies, Limited. He succeeds Mr. T. S. KILPATRICK who becomes director and general manager of the Steel, Peech and Tozer branch on August 1. Mr. Henderson will take up his new appointment in November, 1960, with the intention of relinquishing it on June 30, 1962. Mr. T. SANDERSON, at present director and general works manager of Workington Iron and Steel Company, has been appointed deputy general manager, to take effect from August 1. Mr. H. DARNELL, at present chief engineer, will succeed Mr. Sanderson as general works manager from the same date.

Obituary

The death occurred last week, at the age of 86, of Mr. WALTER SLINGSBY, who was head of the Keighley malleable-metal concern of Walter Slingsby and Company, Limited. After serving his apprenticeship, Mr. Slingsby teamed up with another local man, the late Mr. Charles Dewhirst, to produce the first gas engine made at Keighley. He was an honorary life member and former president of the Keighley Association of Engineers.

Company News

CLIFFORD MOTOR COMPONENTS, LIMITED—Final dividend of 20 per cent. makes 25 (equivalent of 18¾) per cent. for the year ended March 31, 1960, but the capital distribution, not subject to tax, is halved to 2½ per cent.

UNIVERSAL ASBESTOS MANUFACTURING COMPANY, LIMITED—It has been found necessary for administrative reasons to change the qualification date of the proposed one-for-one scrip issue from September 1 to July 26.

ACROW (ENGINEERS), LIMITED—Third quarterly payment makes, with the previous 12 per cent. payments, 35 per cent. to date in respect of the year to March 31, 1960. A total equivalent to 37⅞ per cent. for the full year was paid in 1958-59.

ABWOOD MACHINE TOOLS, LIMITED—Final dividend of 7½ per cent. makes 12½ per cent. for the year ended March 31, 1960, compared with a single payment of 7½ per cent. for the previous year. Net profit rose from £4,860 to £11,993, after tax of £10,918 (£3,956).

MANLOVE, ALLIOTT & COMPANY, LIMITED, general manufacturing engineers, of Nottingham—Net profit for the 15 months to March 31, 1960, was £37,509, compared with £21,365 for the previous year, after tax of £17,481 (£14,871). An ordinary dividend of 25 (11) per cent. is to be paid for the period.

LAPORTE INDUSTRIES, LIMITED—To finance the cost of acquiring the preference and ordinary shares of Peter Spence & Sons, Limited, chemical manufacturers, of London, W.1 (about £2,600,000), £2,627,280 10s. ordinary shares at 21s. each are to be issued on a one-for-eight basis to holders of July 1.

WATSON, LAIDLAW & COMPANY, LIMITED, ironfounders, sugar and laundry machinery manufacturers, of Glasgow—The chairman, Mr. R. W. Lamont, reports a major scheme of reorganization entailing changes in lay-out of works, etc. The foundry has been closed down as being uneconomic. A system of payment by results has been introduced.

EDWARDS HIGH VACUUM, LIMITED, manufacturers of vacuum pumps, gauges, etc., of Crawley (Sussex)—It is proposed to convert the outstanding £11,189 loan stock into ordinary 4s. shares on the basis of 21 shares for each £10 of loan stock. Holders not wishing to convert will be paid off in cash on August 31 at a premium of 1 per cent. with interest accrued to that date.

MIDLAND METAL SPINNING COMPANY, LIMITED—In conjunction with the Aluminium Company of New Zealand, Limited, a new company, Tower Aluminium Company, Limited, has been formed for aluminium manufacturing and marketing in New Zealand. Midland Metal holds 750 £1 shares of the £1,000 capital, the New Zealand company 125 shares, and the remaining 125 shares are held by H. M. Fogarty, Limited, which holds the local agency for Midland Metal.

JOHN HARPER & COMPANY, LIMITED, ironfounders and domestic hardware manufacturers, Willenhall (Staffs)—An electric radiator has been developed—the company's first electrical product—and production will start in time for the autumn selling season. An agreement has been concluded with Hermann Forster, SA, of Switzerland, for exclusive selling rights of its refrigerators in the UK. Group profit was £227,486 (£226,866) before tax of £89,247 (£88,319) and the dividend is 10 per cent. (same equivalent).

W. H. DORMAN & COMPANY, LIMITED, makers of diesel engines and generating sets, of Stafford—Increasing world demand for the engines produced by the firm has overtaken manufacturing capacity in some departments, says Mr. Darby Haddon, chairman. Production difficulties, and not the order-book, is the present limiting factor. The affairs of the subsidiary, W. G. Bagnall, Limited, were reorganized during the year, and Mr. Haddon hopes by next year to be able to say that the sources of its prosperity are as firmly based as those of the parent are now.

SIR WILLIAM ARROL & COMPANY, LIMITED, bridge-builders, structural and mechanical engineers, of Glasgow—A one-for-one scrip issue and a capital profit distribution of 1s. per £1 ordinary share are to be made to holders on August 8. It is also proposed to modify the voting rights of the 7 per cent. cumulative £1 preference shares to conform to modern practice. As compensation for certain restrictions of voting rights thus involved a one-for-eight scrip issue is to be made to holders of August 8. Early in September the board intends to declare a 5 per cent. interim dividend for 1960 on the increased ordinary capital.

Full Production at Consett Iron Company

Lord Ridley, chairman of Consett Iron Company, Limited, reports that "Prospects for the steel industry for at least the next six months appear very good." Production in all departments of the company has been as high as possible since August, 1959. A loss of plate orders has been suffered from the shipbuilding and repairing industries but the demand from other directions has been more than sufficient to keep existing mills fully occupied. The new mill will be capable of increased output—25 per cent. of the ingot output is rolled into various light products at the Jarrow Mill. Nearly £7,500,000 was spent on the new plate mill during the year and it is expected to be in operation by the scheduled date. It has been possible to take on more men, including 400 who became redundant through the closing of local collieries.

Consett, he stated, will be the first in the country to operate both the L.D. process for making the normal range of steels and the Kaldo process for the variety of special steels made by the firm. Substantially all the plant has been ordered and steelmaking in it will begin toward the end of 1961. Trading surplus was £1,359,413 for the six months to the end of March, 1959, £1,431,544 for the six months to the end of September, 1959, and £2,607,680 for the six months to March, 1960.

Prices of Raw Materials stable in June

Index of wholesale prices for basic materials and fuels used in manufacturing industry is given provisionally by the Board of Trade as 102.5 (1954 = 100) for June—the same as in May. The index has now been steady since March. There have been a number of price changes for constituents of the index, however, including declines in the prices of lead, zinc, and rubber.

The rising trend in prices of materials used in the mechanical engineering industries persisted in June. There was also a slight rise in June in the index of prices of all manufactured goods which, on the same 1954 basis, rose to 112.9 from 112.8.

YALE & TOWNE MANUFACTURING COMPANY—Mr. Gordon Patterson, the Detroit industrialist, has been elected a director and president of the company.

Pig-iron and Steel Production

Statistical Summary of May Returns

The following particulars of pig-iron and steel produced in Great Britain are from statistics issued by the British Iron and Steel Federation. Table 1 summarizes activities during recent months. Table 2 gives production of steel ingots and castings in May. Table 3, weekly average production of finished steel in April. Table 4 gives the production of pig-iron and ferro-alloys in May, and furnaces in blast. (All figures are weekly averages in thousands of tons).

TABLE 1.—*Iron and Steel Index and General Summary of Pig-iron and Steel Production.*

Period.	B.o.T. Price Index, 1938 = 100.			Iron-ore output.	Imported ore used.	Coke sent to blast furnaces.	Pig-iron, ferro-alloys prod.	Scrap used in steel prod.	Steel (incl. alloy).			
	Iron and steel.	Coal.	Basic materials[1]						Imports.[2]	Prod. ingots, castings.	Delivrs. finished steel.	Stocks.[3]
1957	328	488	537	325	303	270	275	220	14	417	322	2,580
1958	343	403	478	276	262	227	245	196	9	369	284	2,242
1959	340	497	477	286	244	210	242	208	7	388	291	2,244
1960—March[4]	337	502	487	347	325	262	312	286	19	485	376	2,243
April ..	338	502	489	326	329	265	311	251	23	478	369	2,292
May ..	338	483	489	337	317	261	299	252	27	475	392	2,245

TABLE 2.—*Average Weekly Production of Steel Ingots and Castings in May.*

District.	Open-hearth.		Bessemer.	Electric.	All other.	Total.		Total ingots and castings.
	Acid.	Basic.				Ingots.	Castings.	
Derbys, Leics, Notts, Northants, and Essex ..	—	4.8	16.8 basic	2.9	0.1	22.9	1.7	24.6
Lancs. (excl. N.-W. Coast), Denbighs, Flintsand Cheshire	0.6	40.7	—	5.7	0.3	45.8	1.5	47.3
Yorkshire (excl. N.-E. Coast and Sheffield) ..								
Lincolnshire	—	49.6	—	—	0.1	49.6	0.1	49.7
North-East Coast	0.9	87.4	—	1.6	0.5	88.4	2.0	90.4
Scotland	1.3	46.6	—	3.9	—	49.8	2.0	51.8
Staffs, Shrops, Worcs. and Warwicks ..	—	25.7	—	4.3	0.8	28.9	1.9	30.8
S. Wales and Monmouthshire	2.2	91.4	16.1 basic	0.7	0.1	110.1	0.4	110.5
Sheffield (incl. small tonnage in Manchester) ..	9.7	39.0	—	14.4	0.3	61.3	2.1	63.4
North-West Coast	—	—	6.0 acid	0.9	—	6.8	0.1	6.9
Total	14.7	385.2	38.9	34.4	2.2	463.6	11.8	475.4
April, 1960	11.4	394.9	37.7	32.1	2.0	467.5	10.6	478.1
May, 1959	12.2	319.3	25.7	25.5	1.9	375.3	9.3	384.6

TABLE 3.—*Deliveries of New Non-alloy and Alloy Finished Steel*

Product.	1958.	1959.	1959.		
			April.	March.[4]	April.
Ingots, blooms, billets, and slabs[5] ..	4.6	5.1	6.0	5.5	5.8
Heavy rails ..	10.2	6.8	8.2	10.0	9.3
Sleepers	1.2	0.6	1.5	0.5	0.5
Fish and soleplates ..	0.7	0.4	0.5	0.6	0.7
Plates:					
(i) Over ¾ in. thick	29.6	24.8	25.4	31.3	31.3
(ii) Under ¾ in. ..	17.7	18.3	17.4	23.2	23.9
Other heavy prods. ..	41.8	41.2	40.3	56.3	56.5
Ferro-concrete bars ..	7.6	9.6	8.7	12.7	10.2
Wire rod	21.5	23.5	24.6	29.9	29.8
Arches, etc.	8.6	7.8	8.9	8.5	8.6
Other light sections ..	29.1	33.0	32.6	45.5	41.7
Bright steel bars	6.2	7.6	7.7	10.3	10.0
Hot-rolled strip	22.6	27.4	27.3	35.3	33.8
Cold-rolled strip	7.0	8.0	7.8	10.7	9.9
Sheets incl. coated:					
(i) Hot-rolled	10.6	11.8	10.4	13.9	13.5
(ii) Cold-reduced ..	31.1	35.2	38.8	43.5	40.2
Tinplate:					
(i) Hot-dipped ..	8.4	7.7	7.7	9.1	9.2
(ii) Electrolytic ..	10.3	13.2	13.8	15.6	15.2
Blackplate	0.8	0.7	0.6	1.0	0.8
Tubes up to 16 in. ..	19.0	20.6	20.9	24.5	24.1
Tube fittings, etc. ..	0.4	0.4	0.4	0.4	0.4
Tyres, wheels, axles ..	4.5	2.4	3.0	2.8	2.3
Forgings(excl. drop) ..	2.6	2.1	2.4	2.2	2.2
Steel castings	4.2	3.6	3.9	4.3	4.0
Tool steel	0.2	0.2	0.2	0.2	0.2
Total	300.5	312.0	319.0	397.8	384.1
Alloy steel	16.1	18.2	19.1	23.1	22.5
Total deliveries from UK production[6],	316.6	330.2	338.1	420.9	406.6
Add: Imported finished steel ..	7.0	7.1	9.7	15.1	23.2
	323.6	337.3	347.8	436.0	429.8
Deduct: Intra-industry conversion[7] ..	41.2	47.6	51.5	61.2	62.0
Total new material ..	282.4	289.7	296.3	374.8	367.8

TABLE 4.—*Production of Pig-iron and Ferro-alloys*

District.	Furnaces in blast.	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total
Derbys, Leics, Notts, Northants, and Essex ..	21	—	31.4	21.9	0.2	—	53.5
Lancs (excl. N.-W. Coast), Denbighs, Flints, and Cheshire ..	6	—	17.1	—	—	1.9	19.0
Yorkshire (excl. N.-E. Coast and Sheffield) ..	—	—	—	—	—	—	—
Lincolnshire ..	8	—	38.7	—	—	—	38.7
N.-E. Coast ..	17	1.9	60.3	—	—	1.4	63.6
Scotland	7	—	25.8	1.5	—	—	27.3
Staffs, Shrops, Worcs, and Warwicks ..	5	—	8.1	1.0	—	—	9.1
S. Wales and Monmouthshire	11	3.2	60.9	0.7	—	—	64.8
Sheffield	2	—	3.4	—	—	—	3.4
North-West Coast ..	8	16.9	—	1.5	—	1.3	19.7
Total ..	85	22.0	245.7	26.6	0.2	4.6	299.1
April, 1960 ..	86	26.4	252.5	27.9	0.1	3.7	310.6
May, 1959 ..	80	19.0	198.5	17.3	1.4	4.3	240.5

[1] Used in non-food manufacturing industries.

[2] Weekly average of calendar month.

[3] Stocks, mainly ingots and semi-finished, at the end of the year and months shown.

[4] Five weeks, all tables.

[5] Other than for conversion into any other form of finished steel listed.

[6] Includes finished steel produced in the UK from imported ingots and semi-finished steel.

[7] Material for conversion into other products also listed in this table.

News in Brief

A NEW HOUSE ORGAN, the *Ball Bearing Journal—a Quarterly Review of Rolling Bearing Engineering*, is being published by the Skefko Ball Bearing Company, Limited, Luton.

THE BIRMINGHAM OFFICE of Allen West & Company, Limited, was transferred on July 18 from 117, Dale End to larger premises at Pearl Assurance House, Temple Row, Birmingham, 2.

HIGH DUTY ALLOYS, LIMITED, transferred their Birmingham sales office on July 23, from Queen's College Chambers, Paradise Street, to 369, City Road, Edgbaston, Birmingham 16. (Telephone: Bearwood 2344-5).

A SPECIAL EDITION of the Swedish newspaper, *Svenska Dagbladet*, has been issued covering European economic co-operation. It reviews Sweden's main industries and economic conditions, and is printed in English, French and German.

FABRICATED RESIN PRODUCTS, LIMITED, Vicar's Moss Works, Walker Street, Rochdale, is the new name and address of the establishment producing patterns, etc., previously under the name of Haywood Bros., of Littleborough.

FAG BEARING COMPANY, LIMITED, of Macrome Road, Green Lane, Tettenhall, Wolverhampton, announce the opening of a branch office at Swansea, situated in 36, Mansel Street. It is under the management of Mr. B. J. Reynolds.

Mr. J. HUGH NEILL, of James Neill & Company (Sheffield), Limited, addressed the Association of Engineering Distributors at the Park Lane Hotel, London, on July 5 on the subject of "Should Resale Price Maintenance be Abolished?"

THE SECRETARIES of the West Riding Ironfounders' Association (Charles D. Buckle & Company) report that premises in their office area have been re-numbered and their new address is 35, Cheapside, Bradford, 1 (instead of number 13).

A CONTRACT for the supply of prestressed-concrete pressure pipes and spun-iron pipes worth approximately £40,000 has been placed with the Stanton Ironworks Company, Limited, near Nottingham, by the Cardiff Corporation Waterworks.

DOWTY HYDRAULIC UNITS, LIMITED, of Ashchurch, Glos, have concluded licence arrangements with Berry Hydraulics, Mississippi, and Malcolm Moore Industries, Limited, of Melbourne, for the manufacture of the UK firm's pressure-balanced gear pumps and motors.

INTERKAMA is the portmanteau word for an International Congress and Exhibition for Instrumentation and Automation to be held in Düsseldorf from October 19 to 26. Details are available from John E. Buck & Company, Limited, 47, Brewer Street, Piccadilly, London, W.1.

FESLENTE, LIMITED announce that from August 1 their resin-coated sand will be marketed in the British Isles by the parent company—British Industrial Sand, Limited, Holmethorpe, Redhill, Surrey. It is emphasized that the change is made to simplify records and accounting procedures.

ONE OF AUSTRALIA'S biggest displays of engineering equipment opened in Sydney on July 18 at the fourth biennial Sydney Engineering Exhibition. Equipment on show ranged from spanners to giant rockcrushing machines, diesel engines and electronic and automation equipment. Two hundred firms participated.

AN ORDER for 22,000 tons of steel billets, worth approximately £800,000, has been placed with the Rhodesian Iron & Steel Company, Limited, by the British Iron & Steel Corporation. Reporting this from Rhodesia, Barclays Bank D.C.O. states that this is the first time that Britain has imported steel from this source.

CROCKETT LOWE, LIMITED, Summer Hill Street, Birmingham, announce that they have acquired the entire share capital of Robinson & Knee, Limited, 27, Procter Street, Nechells, Birmingham 7. The latter company employs 34 patternmakers and is mainly engaged on the manufacture of pattern equipment for the aircraft and automobile industries.

HUNT & MITTON, LIMITED, engineers and brassfounders, Brass Works, Birmingham, have received an order from Francis Shaw & Company, Limited, machinery manufacturers, Manchester, for the supply of automatic and manual valving for use in a rubber-tyre plant to be erected in Rumania. The order is worth about £55,000.

BSI NEWS FOR JULY lists the iron products which have received Kite marks for products conforming to BS. 416—cast-iron spigot and socket soil, waste and ventilating pipes and fittings; BS. 460—cast-iron rainwater goods and BS. 1205 also cast-iron rainwater goods. Under the first, there are 19 firms; the second, 11, and the third, 10.

A HIGHER SCALE OF CHARGES for installing cookers, water heaters and other appliances by the North Eastern Gas Board, was accepted by the area Gas Consultative Council at Leeds on July 18. The Board has been losing £120,000 at the previous uneconomic scale which was fixed to help sales. The higher scale will recoup about £70,000 a year.

QUALITY CONTROL and technical advances in steelmaking will be the general theme of the joint display of Samuel Fox & Company, Limited, and the Steel, Peech & Tozer branch of the United Steel Companies, Limited, at the Society of British Aircraft Constructors' Flying Display and Exhibition, to be held at Farnborough from September 5 to 11.

THE ANNUAL CONFERENCE of the European Organization for Quality Control will be held at Church House, Westminster, London, S.W.1, on September 1, 2 and 3. Its title will be "Controlling Product Quality—its Value to Industry." Full details of the conference programme can be had by writing to the British Productivity Council, 21, Tothill Street, London, S.W.1.

Dr. J. J. GILMAN, of the Research Laboratory, General Electric Company, Schenectady, USA, is to give a lecture on "The Physical Nature of Plastic Flow" under the auspices of the Metal Physics Committee of the Institute of Metals. The meeting will take place at the Institute's Headquarters, 17, Belgrave Square, London, S.W.1, on August 16, at 6.30 p.m.

IN A DEAL worth more than £862,000 Brightside Engineering Holdings, Limited, of Sheffield, are buying Graham Firth Steel Products, Limited, Walsall, the cold rollers of steel strip and section rollers of Bescott, Walsall. The Walsall company was established in 1937 by Mr. L. Graham Firth who has been its managing director all along. He is also a director of the Brightside company.

A GUATEMALAN COMPANY, acting as contractors to the Municipality of Guatemala City, urgently needs between 20,000 and 30,000 metres (22,000 and 33,000 yds.) of cast-iron centrifugal cut water mains from 14 to 18 in., with mechanical joints, and about 5,000 ft. of water-well casing. Interested suppliers

News in Brief

should write to Sres. Felix Montes y Cia., 8a Calle 3-27, Guatemala City, Guatemala.

THE FIRST STEP in the progressive removal of Solartron Laboratory Instruments, Limited, from Thames Ditton, Surrey, to a new esablishment at Cox Lane, Chessington, Surrey, has begun, and the departments dealing with United Kingdom instrument sales, instrument service and despatch, and the exports division of the Solartron Electronic Group, Limited, are already installed at Chessington.

A METAL THEFT being investigated at York concerns the disappearance of the bells of St. Martin's Church, which was left a shell by German bombers in the war. Seven of the eight bells which date back to 1729, are missing; only one large bell, weighing several hundredweight, is left. The ruins are kept locked and how the bells were removed remains a mystery. It is thought they may have been taken away in pieces.

THE AYRSHIRE DOCKYARD COMPANY, LIMITED, a member of the Lithgow group of companies, announce that it has acquired Panther Ceilings, Limited, of Manchester. The firm's product—acoustically and thermally-insulated ceilings—will be made at Irvine, Ayrshire, and sales will be confined, initially, to the UK and Canada. The acquisition of Panther Ceilings, Limited, brings the total number of companies in the Lithgow group to 33.

TWO-HUNDRED old cast-iron gas street-lamps in Glasgow have been bought by the Muirhead Moffat concern for an American. The lamps, it is understood, are required by the owner of an airline to lend an authentic appearance to a frontier village of an airport in New Jersey. This field of cast-iron architecture in which the Saracen Foundry, Glasgow, excels, embraces all types of ornamental ironwork from drinking fountains to four-storey shop fronts.

A £610.000 CONTRACT for cross-Channel power cables has been placed by the Central Electricity Generating Board with Associated Electrical Industries, Limited, and British Insulated Callender's Cables, Limited. These two cablemaking concerns will lay half of the cross-Channel submarine power-cable link which will connect the national electricity systems of Britain and France. The other half will be laid by cablemaking companies appointed by Electricite de France.

FIFTY-TWO diesel hydraulic locomotives of 1,100 h.p., built at the Glasgow works of the North British Locomotive Company, Limited, are now being delivered to the Western Region of British Railways. The locomotives, designed for mixed traffic-duties, have a maximum speed of 75 m.p.h. and a maximum tractive effort of 40.000 lb. and are generally similar to the six prototype 1.000 h.p. diesel hydraulic locomotives which were delivered last year for service in the Western Region.

A NUMBER of modernization projects of the Osborn Group are set out in the latest issue of *Hand and Heart*, the works magazine. At Wicker Works, Sheffield, two new electric-arc melting furnaces of 1 ton and 4 tons capacity are to be installed; a number of rolling-mill furnaces there are being changed to automatic control. At the Regent Works the modernization of the 17-in. hot sheet-rolling-mill will be completed in August; a new oxygen-producing plant to be installed at the Rutland Works will be the first of its type in Sheffield.

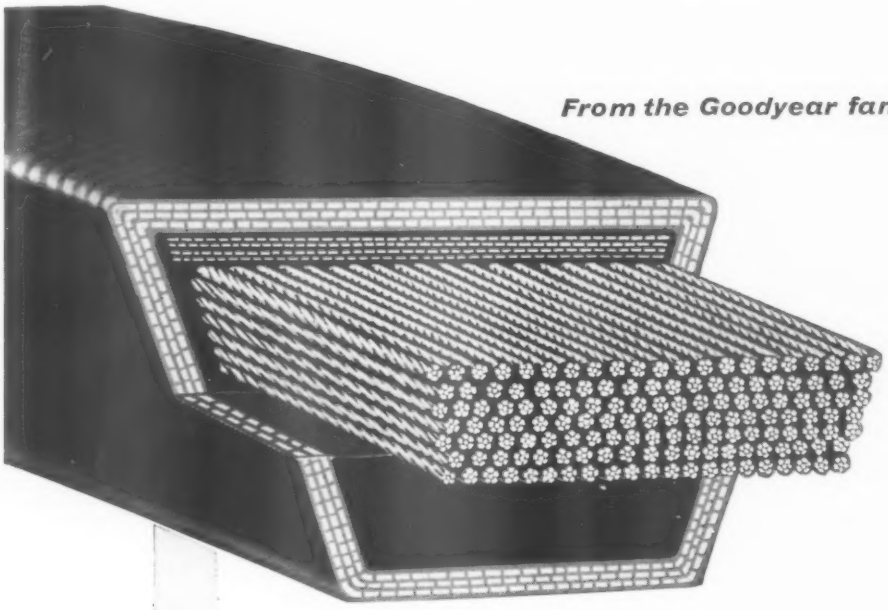
DAVID BROWN-FOOTE GEARS, LIMITED, a company jointly owned by the David Brown Corporation, Huddersfield, and Foote Brothers Gear & Machine Corporation, of Chicago, has been formed in Toronto, to provide new distributive arrangements for David Brown gear products in Canada and Western America. A partnership between the two gear-manufacturing companies was formed a year ago. The new jointly-owned company will take over the sales and distribution in Canada of gear, transmission and chain products manufactured by both companies and their associates. David Brown (Canada), Limited, of Toronto, will concentrate in future on the marketing of David Brown tractors and farm machinery. Foote Brothers Gear & Machine Corporation, Limited, have taken over the Gear Division of David Brown, Inc., San Leandro, California, and will now be responsible for the sales and distribution of David Brown in western United States.

KESWICK GRANITE COMPANY, LIMITED, has failed to sell the 1-ft. 3-in. gauge Ravenglass and Eskdale Railway in West Cumberland privately, and it will be auctioned at Gosforth on August 10. It was built 82 years ago to carry stone from the Eskdale mines. The line is 7½-miles long and there are two model steam and three diesel locomotives, station buildings, repair shops, wagon shed, a café and shop. The engines will probably be sold for use on other railways and the permanent way for scrap. It has provided a means of transport for residents and holiday-makers up the valley for many years.

AN ORDER worth about £700.000 for electrical equipment for a new rod mill has been obtained by the heavy plant division of Associated Electrical Industries, Limited, from the Broken Hill Proprietary Company, Limited, Australia. Switchgear, control gear, auxiliary drives, and other equipment are included in the order. Most of the electric-control equipment required will be manufactured in Australia by Australian Electrical Industries (Proprietary), Limited. Responsibility for manufacturing the rest of the equipment will be divided between the Rugby and Manchester (Trafford Park) works of AEI.

HEAD WRIGHTSON MACHINE COMPANY, LIMITED, has received an order from the Davy & United Engineering Company, Limited, Sheffield, for rolling levellers forming part of the new plate mill to be installed at the works of the Consett Iron Company, Limited. The firm has recently completed a roller leveller for the Wallsend shipyard of Swan, Hunter & Wigham Richardson. The two machines and their associated roller tables are worth £200.000. The firm also has an order from the South Durham Steel & Iron Company, Limited, for two roller levellers to be installed in the plate mill of their new south works at West Hartlepool.

MR. CHARLES ORR-EWING, Civil Lord of the Admiralty, told members of Nottingham Chamber of Trade on July 18 that smaller firms should enter the export market more fully. He said, "We should like to see more active participation in the export field by medium-size and small firms who are perhaps nervous of undertaking what at first seems a large commitment." He stressed the assistance that was available to help. He said sales efforts should be made up of a team of three—the salesman, the engineer or technical adviser, and someone to look after the legal side of the business. Commander W. C. Cooper, chairman and managing director of Manlove & Alliott Company, Limited, specialists in the manufacture of laundry machinery and hospital sterilization equipment, endorsed this view. Mr. Orr-Ewing visited the firm's premises in Norton Street, Nottingham, and congratulated them on exporting 25 per cent. of their products.



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IT'S GOT A GRIP ON PRODUCTION

You can't afford lost power . . . costly shutdowns due to transmission failures . . . That's why Goodyear is so often first choice where V-Belt efficiency and reliability is vital. It's best for the job because it's built for the job. From huge multi-vee installations to small F.H.P. applications there's a 'job-designed' belt in the Goodyear family tree to suit every drive and duty. The Goodyear Technical Service is freely available to advise on choice and optimum working conditions for longest, trouble-free performance.

* **E.C.V. for multi-vee installations** Withstands high starting torques, sudden shocks, pulsating loads. Tough rubber-impregnated fabric preserves belt section, resists side wear and gives positive grip.
* **F.H.P. for fractional horse-power loads** Will absorb the shocks and strains of sudden starting and stopping. Also designed to withstand the high rate of flexing arising from the compactness of short centre, high speed, small pulley drives.

GOODYEAR

THE GREATEST NAME IN RUBBER

The Goodyear Tyre & Rubber Company (G.B.) Ltd., Industrial Products Dept., Wolverhampton
Export Enquiries: 17 Stratton Street, London, W.1.

Raw Material Markets

Iron and Steel

The summer holiday period has now begun at some foundries and from this weekend until August 8 a large number of establishments, particularly those in the Birmingham and Staffordshire areas, will be closed entirely for a fortnight's annual holiday, and only the labour required to carry out necessary repairs to plant, structures, and cupolas will be engaged. During the long break opportunity will be taken to carry out major repairs and alterations which may be required, so that on resumption after the holiday uninterrupted production may be obtained.

During the holiday most establishments have suspended deliveries of raw material. The present supply position of pig-iron, scrap, and coke is easy and consumers generally have adequate stocks on hand, but should increased supplies be required these are readily obtainable. Outputs of all grades of foundry irons and hematite are more than adequate to meet present demands. Most producers would welcome increased business to absorb fully present production which could be stepped up if demands warranted.

Makers of high-duty castings continue, comparatively, the most favourably engaged, and demands from many trades, particularly the motor vehicle industry, are at high levels. The light, jobbing, and textile foundries are not so favourably placed and most of these foundries could undertake a much larger flow of business.

Many of the re-rollers, including most of the mills in the English Midlands, will have their fortnight's annual holiday from July 25 to August 8. Production will cease during that period and only the maintenance staff required to undertake essential repairs and alterations to plant and equipment will be employed. There is also no necessity to accept deliveries of steel semis during the closure as stocks in most grades and sizes are adequate, and fairly quick deliveries can be obtained of additional supplies should these be found necessary on resuming work.

The re-rollers have good order-books for all their products and outputs are at maximum levels, consistent with the labour available which is below requirements.

Non-ferrous Metals

Tin, which has been a strong market in London, Singapore, and New York for the past three weeks, has now eased off somewhat following the rumour that the US stockpile authorities are considering the possibility of releasing metal from its stocks, estimated to be in the region of 250,000 tons of metal. Although the present state of international tension must militate against such a move being made, the somewhat indifferent attitude the US has always taken towards the International Tin Agreement inclines observers towards the view that it could be a possibility.

This rumour apart, the outlook for tin is still very bright: consumption is at a high level and production is not expanding with the higher price. Indeed, in Malaya it is thought that the mines are running down their stocks to fill the higher quotas and many of the mines which were closed over the past two years have flooded and are not being brought back into operation.

In any event demand is good in London, in the East, and in New York where the price is now around $1.05 a pound and indications are that the London quotation may well go towards £830 a ton, the point at which the buffer stock manager can again enter the market.

Copper in London has turned quiet due to more settled conditions in the Congo, a further rise in LME stocks to 5,274 tons by the end of last week, and some bearish statistics released in the US which showed that production is running well ahead of consumption and that stocks are rising. On the other hand, there are some bullish factors in the offing—particularly the strong possibility of a strike at Chuquicamata on October 1 when the current labour contract expires. The unsettled conditions in Rhodesia also contribute.

In the US, despite the weak demand trend prices have been maintained and will now in all probability hold at their present levels. The US price of 33 cents a pound is still quoted by both producers and custom smelters.

Lead is a quiet market on both sides of the Atlantic. In London supplies are plentiful and the price is hovering weakly around £70 a ton. In the US the quotation is unchanged at 12 cents a pound.

Zinc is also a quiet market in London and in New York where the quotation is unaltered at 13 cents a pound. Both lead and zinc look like remaining quiet markets during the present holiday period and it is thought that no definite trend of prices will emerge until after the Lead Zinc Study Group meeting in Geneva in the first part of September.

Borough Polytechnic Courses

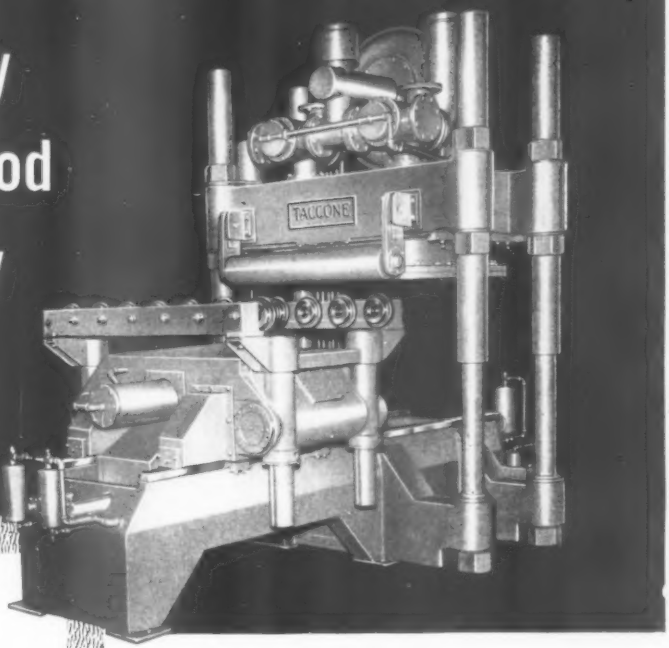
The Borough Polytechnic, Borough Road, London, S.E.1, announce that a course of eight special lectures on the subject of automatic control and its application to mechanical engineering has been arranged for Tuesday evenings at 7 p.m., commencing on October 11. The lectures are intended for practising engineers who are interested in the use of automatic control methods and their current industrial applications.

The programme includes the following lectures:—"Brief Survey of the Principles of Automatic Control," by L. G. Heywood (Borough Polytechnic); "Pneumatic Instruments in Process Control," by N. Robertson (A.E.I. Instrumentation Division); "Automatic Control of Operations and Processes in the Ford Thames Foundry," by K. H. Lee (Ford Motor Company, Limited); "Electronics in Process Control," by C. G. Seeds and W. Barber (Dewrance & Company, Limited); "Automatic Control of Machine Tools," by J. W. Smith (Teddington Industrial Controls); "Automatic Control of Boiler-house Plant," by P. J. Wheeler (Bailey Meters and Controls, Limited), and "Automatic Control in the Steel Industry," by M. H. Butterfield (British Iron and Steel Research Association).

The Starfire

At a Press reception held on July 20, Allied Ironfounders, Limited, at their London showrooms, 28 Brook Street, W.1, introduced a way of transforming old-fashioned fireplaces by the installation of their new unit known as the "Starfire," which will be available for sale next September. Details of a display competition for the company's merchant stockists is to be announced when deliveries commence. The first prize will be £50, the second £20, the third £10, and there will be more than 100 other prizes. In his address to the Press, Mr. H. C. Wilson Bennetts, joint managing director, underlined Allied Ironfounders' faith—as the biggest producer of solid-fuel burning domestic appliances in the country—in the future of solid fuel and coal in particular on the domestic hearth.

An entirely NEW method of Foundry Moulding



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'TACCONE' HIGH PRESSURE DIAPHRAGM MOULDING MACHINE

The 'Taccone' machine makes precision green sand pressure moulding available to every foundry. It ensures sound, accurate castings and the moulds it produces are superior to those made by conventional equipment. 'Taccone' moulds are consistently hard and uniform throughout and can be effortlessly produced by unskilled labour.

All types of pattern equipment, including plaster wooden, plastic and metal patterns can be used, and there is practically no limitation on the size of flask employed. 'Taccone' machines are handling flasks 8ft. by 8ft. (larger sizes are envisaged) and already over 200 'Taccone' installations are in operation.

The dimensional accuracy and finish on the castings is comparable with work produced by shell moulding techniques.

The 'Taccone' is more than a machine, more than a process—it is a revolutionary system for rapid mould production.

Ten standard machines are available in the manufacturing range and special machines can be built to any size for any purpose.

For further details of this and other foundry machinery write to:

Baker Perkins Limited, *Engineers*

BEDEWELL DIVISION, HEBBURN-ON-TYNE, Co. DURHAM.

TEL: JARROW 897134

Current Prices of Iron, Steel, and Non-ferrous Metals

(*Delivered unless otherwise stated*)

July 27, 1960

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2, 10-ton lots or over: Middlesbrough, £21 6s. 0d.; Birmingham, £20 18s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.40 per cent. P. 10-ton lots or over, £23 5s. 0d., delivered Birmingham, £23 10s. 0d., delivered Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 6s. 6d.; South Zone, £25 9s. 0d.

Refined Malleable.—P, 0.10 per cent. max.: North Zone, £26 6d. 6d.; South Zone, £26 9s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent., 10-ton lots or over; N.-E. of England (local iron), £23 19s. 0d.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 7s. 6d.; Birmingham, £25 14s. 0d.; Wales (Welsh iron), £23 19s. 0d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leicestershire in 10-ton lots or over.

FERRO-ALLOYS

(*Per ton unless otherwise stated, delivered*)

Ferro-Silicon (6-ton lots and over).—45 per cent. Si, £42 10s. 0d. to £44 10s. 0d., scale 15s. 0d. per unit, lumpy; 75 per cent. Si, £57 15s. 0d. to £61 10s. 0d., scale 15s. 0d. per unit, lumpy.

Ferro-Vanadium.—50/60 per cent., 20s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 10d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 12s. 1d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 15s. 1d. per lb. of W.

Ferro-chrome (6-ton lots and over, lumpy).—4/6 per cent. C, £80 10s. 0d. to £84 10s. 0d., basis 60 per cent. Cr, scale 27s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £79 0s. 0d. to £82 £0s. 0d., basis 60 per cent. Cr, scale, 27s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8½d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.10 per cent. C,* 1s. 9¾d. to 2s. 0¾d. per lb. Cr; 0.06 per cent. C,* 1s. 10¾d. to 2s. 1d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £275 0s. 0d.; 96/98 per cent., £285 0s. 0d.

Ferro-columbium.—65/67 per cent., Cb + Ta, 19s. 9d. per lb., Cb + Ta.

Ferro-manganese (Standard).—78 per cent., £61 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., 100 tons & over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 6 to 35 tons, £33 15s. 6d.; hard (0.41 to 0.60 per cent. C), under 10 tons, £34 17s. 0d.; silico-manganese, under 10 tons, £43 16s. 6d.; free-cutting, under 10 tons, £36 14s. 6d. SIEMENS MARTIN ACID (under 10 tons): Up to 0.25 per cent. C, £41 1s. 0d.; silico-manganese, £44 4s. 0d.

Billets, Blooms, and Slabs for Forging and for Stamping (under 10 tons).—BASIC: soft, up to 0.33 per cent. C, £38 10s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £39 12s. 6d.; acid, up to 0.25 per cent. C, £43 4s. 0d.

* Average 68-70 per cent.

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Heavy Plates and Sections (1 ton to 10 tons).—Ship plate (N.-E. Coast), £41 12s. 0d.; boiler plates (N.-E. Coast), £44 2s. 0d.; floor plates (N.-E. Coast), £43 10s. 0d.; angles (N.-E. Coast), £38 16s. 6d.; joists (N.-E. Coast), £38 12s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 0d.; under 4 tons to 2 tons, £41 3s. 0d.; hoop and strip, coils, 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons, £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £68 5s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £67 17s. 0d.; nickel-chrome, £98 11s. 0d.; nickel-chrome-molybdenum, £111 4s. 0d., in lots of 5 tons to under 10 tons.

NON-FERROUS METALS

Copper.—Cash, £254 5s. 0d. to £254 10s. 0d.; three months, £248 5s. 0d. to £248 10s. 0d.; settlement, £254 10s. 0d.

Copper, Tubes, etc.—Solid-drawn tubes, 2s. 5¾d. per lb.; rods, 273s. 6d. per cwt. basis; 20 s.w.g., 308s. 6d. per cwt.

Tin.—Cash, £818 0s. 0d. to £818 10s. 0d.; three months, £818 0s. 0d. to £818 10s. 0d.; settlement, £818 10s. 0d.

Lead (Refined Pig).—Second half July, £71 15s. 0d. to £72 0s. 0d.; second half October, £72 2s. 6d. to £72 5s. 0d.

Zinc.—Second half July, £90 0s. 0d. to £90 2s. 6d.; second half October, £89 12s. 6d. to £89 15s. 0d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £126 10s. 0d.; rolled zinc (boiler plates), all English destinations, £124 5s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £105 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 2s. 0¾d. per lb.; sheets to 10 w.g., 222s. 3d. per cwt.; wire, 2s. 10¼d.; rolled metal, 222s. 3d. per cwt.

Brass (Brazing).—BS1400, B3, £177; B6, £226.

Brass (High Tensile).—BS1400, HTB1, £203; HTB2, £222; HTB3, £236.

Gunmetal.—BS1400, LG2, £225; LG3, £235; G1, ½%, £290; G1, 1%, £277.

Phosphor Bronze.—BS1400, PB1 (AID released), £320; BS1400, 90/10/1, £305.

Leaded Phosphor Bronze.—BS1400, LPB1, £245.

Phosphor Bronze Strip, etc.—Strip, 316s. 9d. per cwt.; wire, 4s. 3¾d. per lb.; rods, 3s. 6¼d.; tubes, 3s. 6¼d.; chill cast bars, solids 3s. 6¼d.; cored 3s. 7¼d. (CHARLES CLIFFORD, LIMITED).

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 11¾d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 4¾d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 3¾d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 2¼d. to 2s. 3d. per lb.; Antimony, English, 99 per cent., £190 0s. 0d. Quicksilver, ex-warehouse, £70 0s. 0d. to £70 10s. 0d. Nickel, £600 0s. 0d. Aluminium, ingots, £186 0s. 0d.; aluminium bronze (BS1400), AB1, £260, AB2, £268.

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Book Reviews

Mechanical Properties of Intermetallic Compounds—a Symposium: Edited by J. H. Westbrook and published by Chapman & Hall, 37, Essex Street, London, W.C.2; price 76s. net.

The term intermetallic compound is familiar to most metallurgists. In the past, attention has been given to such materials because of their importance as strengthening constituents in precipitation hardening and creep-resistant alloys. However, because the compounds, when added to these alloys, exist as dispersed phases much of the knowledge concerning them is confined to their constitution and crystal structure. This book is noteworthy, therefore, in that it is the first treatment which deals with the mechanical properties of the compounds themselves.

If intermetallics are ever to be used for structural and high-temperature applications, it is clear that a great deal of research into their bulk mechanical properties is required. This book gives a good indication of the general research interest in the subject since it contains some 400 pages of text and diagrams made up from 17 papers presented at a conference on the subject. Each paper is, effectively, a progress report on the present state of various aspects of research in the field. As a consequence the coverage is extremely broad, and includes the preparation and fabrication of intermetallic compounds, some experimental methods for studying them, their deformation and fracture modes, electron microscopical observations, and several papers on the mechanical behaviour of specific compounds such as In/Sb, Ti/Al, Ni/Al, and Fe/Al.

In view of the wide geographical separation of the authors of the individual papers, it is not surprising that the presentation, style, balance, and continuity leaves much to be desired. The discussion included at the end of each chapter is also rather weak. Moreover, it is difficult to visualize what audience the book is directed at. Each paper is a research report, so that the general reader will find the book a little hard to digest, while the more specialized research worker will have seen much of the material already in the various scientific journals. Nevertheless, there are some excellent papers in the book, particularly the review of the literature by Westbrook, and that describing the observation in the electron microscope of the growth of ordered domains presented by Pashley and Presland. It can also be said that if the collection of these various papers into one publication has the effect of stimulating research in this interesting, but rather neglected, field the effort will have been worthwhile.

R. E. SMALLMAN.

Physical and Engineering Properties of Cast Iron. by H. T. Angus, PH.D., M.SC. Published by the British Cast Iron Research Association, Alvechurch, Birmingham; price £3 13s. 6d. (or $11 in the dollar area), £2 12s. 6d. to members of the Association.

This book is described on the title page as "A Data Book for Engineers and Designers." In such a case, it is essential to present the information in an unambiguous form, with a clear declaration of dependent and independent variables which influence the phenomena concerned. Although part 1, on the constitution and structure of cast iron, satisfies this requirement, it is rarely achieved in subsequent chapters.

The author's preface disclaims any attempt to give a complete bibliography, and this is certainly correct. It must detract from the value of the book, since some of the chapters are very sketchy. The reviewer finds it difficult to accept the statement in the preface that a summary of "latest research work" is attempted, particularly when many of the early papers on cast iron, 30 to 40 years old, are included, but much of the middle period, covering ten to 20 years ago, is missing. A typical example occurs in part 6, on internal casting stresses, which should have been incorporated with at least a portion of part 5, on stress-relief heat-treatment, though neither receive other than a very passing mention.

As would be expected in a book originating from BCIRA, the micrographs throughout are excellent examples and beautifully reproduced. The presentation of much factual information on physical and mechanical properties is very good. Part 3, on the general properties of commercial cast irons, is probably the best.

One has a feeling that arrangement of the text and data could have been improved in places, and that the author's chief difficulty was in condensing a vast collection of material over the years. It is customary, in such circumstances, to give full and complete references, whilst dealing most carefully with the scientific aspects in order to guide the user (engineer and designer in this case) in his choice of further reading and use of the data. This book falls between two stools, but is still valuable, provided the engineer is warned that the whole story is not presented. Judging by metallurgical textbooks, the price is high, but the quality of paper and printing is well above average and therefore worth the extra cost.

C. R. TOTTLE.

Overseas Newspapers and Periodicals Guidebook, 7th Edition. Published by Publishing and Distributing Company, Limited, Mitre House, 177, Regent Street, London, W.1; price 30s.

From the cast-metal angle, this guide is very incomplete as less than half of the journals covering foundry practice are listed. Obviously, the reviewer is unable to speak for other trades but, so far as the foundry industry is concerned, the book cannot be recommended as a source of data on overseas publications.

New Catalogues

Foundry Plant. From Electrogenerators, Limited, Australia Road, Slough, Bucks, three brochures have been issued, covering shotblast plant, shotblast cabinets and bale-out furnaces. In each case, apart from being well illustrated, adequate technical data enable the reader to receive a proper appreciation of these interesting items of foundry plant.

Welding Turntables. In publication No. 120 P, Courtburn Positioners, Limited, Kempston Hardwick, Bedford, describe and illustrate a turntable which rotates in either direction for use in continuous welding. One of the models illustrated can be tilted for ease of operation.

Conveyors. In book 242, Herbert Morris, Limited, P.O. Box 7, Loughborough, have assembled annotated pictures of their conveyorized installations in use in a variety of industries, including quite a number in foundries.

Instruments. Bryans Aeroquipment, Limited, Willow Lane, Mitcham Junction, Surrey, has published a series of catalogues covering plotting tables, manometers, micromanometers, tachometer testers, and other instruments used mainly by the aircraft industry.

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AP94

Publications Received

Ninety-sixth Annual Report on Alkali, etc., Works, by the Chief Inspectors. Published by HM Stationery Office, York House, Kingsway, London, W.C.2; price 4s. net.

There are really two reports in this booklet—one presented to the Minister of Housing and Local Government and one to the Secretary of State for Scotland. From the former, the following abstract is printed as being germane to the foundry industry. "There are some 140 to 150 electric-arc furnaces in England and Wales, with capacities ranging from 1 to 80 tons and perhaps with larger units in prospect. Most of the existing units are below 25-tons capacity. Possibly the least difficult of the steel problems is that of the smaller electric-arc furnaces without usage of oxygen. Many of these are without fume-collection systems, but an increasing number of works consider that, in the interests of melting-shop staff alone, dust-extraction systems should be fitted. Our present tentative opinion is that in the majority of cases it will suffice to discharge this collected air by a chimney of sufficient height to allow adequate dispersal of fume. With new installations intended to be operated without oxygen lancing, sufficient space should be left for intercalcation of cleaning plant in case it becomes necessary at some future date. Where there is usage of oxygen, and it is believed that this will be the case with the vast majority of plants, all new units must be fitted with best practicable means of gas cleaning. Possibilities are electrical precipitation, bag-filtration or high-efficiency washers, *e.g.* of the Venturi or disintegrator type. With existing units, the appreciable and regular application of oxygen will require the eventual installation of one of the previously-mentioned types of cleaning plant. A still unresolved point arises on the standard of attainment in the design of such cleaning plant. There is insufficient information for us to be definite. Tentatively, it is felt that the target may well be a reduction in dust burden to below 0·05 grain per cub. ft., but it is certainly too early to quote a standard whether it be in terms of optical obscuration or grains per cub. ft. The great variation in size of electric-arc furnaces is such that considerable freedom must be allowed to the district inspector. It might be unrealistic to apply the same standards at both ends of the scale. Moreover, there may be a great number of cases between almost negligible oxygen usage and heavy lancing.

"A much more serious and difficult matter is that of emissions from hot-blast cupolas. This has been carefully investigated and has been discussed at some length with a technical panel of the Joint Iron Council. It soon became apparent that hot-blast cupola operation was not a mere melting process for the supply of metal for foundry processes, but must more properly be seen as a metallurgical operation of some precision. The matter was one of urgency. At the time of the public enquiry leading to the order of 1958, hot-blast cupolas were few and of the recuperative type. The externally-fired type was not generally known. The hot-blast technique is now extending and a number of projected plants or conversions of cold-blast cupolas were being held up, pending a decision on the means to be taken to deal with the waste gases. The potentialities for interfering with local amenities—to put it no higher—were more serious than at first supposed. The larger units may have a throughput of 25 tons per hr., comparable with the smaller blast-furnaces, and there may be two or more on the same site. It was appreciated on both sides that the relative newness and limited use of hot-blast had restricted opportunities for investigation and there were still many uncertainties. We have now agreed with the industry the broad lines of a provisional 'best practicable means' for dealing with emissions. The measures agreed, which have been designed to cover both externally-fired and recuperative plants, require the arrestment of particulate matter and the discharge of fume at a height determined by the scale of operations. They are provisional in the sense that they are designed to cover an interim period of experience and research which may well lead to the evolution of improved means including the arrestment of fume. Meantime, they are a reasonable solution and should enable industry to proceed with its policy of development."

The following is an extract from the Chief Inspector to the Secretary of State for Scotland and concerns iron and steel works. "No hot-blast cupolas appear to be in operation in Scotland but proposals to erect two such cupolas were received in the course of the year. In one case, agreement has been reached on the type of grit arrestment and on the height of chimney for the cupolas. Agreement in principle has been reached in the other case, but final agreement awaits a decision by the proposers on the type of cupolas to be erected. With hot-blast cupolas, the emission appears to be predominantly iron-oxide fume containing grit. On the other hand, the common cold-blast cupola, which is not registrable, emits mainly grit and it is generally considered sufficient to provide simple wet-grit arrestment without a chimney. Exceptions, of course, do exist and two local authorities brought forward for advice instances where chimneys appeared desirable."

Prospectus 1960/61 of the Poplar Technical College, Poplar High Street, London, E.14.

Outstanding in the provision of patternmaking classes in the London area, the Poplar Technical College not only gives tuition which covers the requirements of the City & Guilds of London Institute examinations, but also organizes courses of study for diploma students who have been journeymen pattern-makers for at least ten years. Tuition in foundry practice covers all City & Guilds requirements, and the booklet announces that a summer course for engineering draughtsmen will be held. Most of the classes at the College take place during the evenings and those interested should write to the principal, Mr. P. J. Howard, B.SC., for a copy of this prospectus.

Safety No. 9. Published by the British Iron and Steel Federation, Steel House, Tothill Street, London, S.W.1.

The iron and steel industry takes a commendable and very active interest in accident prevention. Because of increasing activity within the industry, the accident rate is increasing and is predicted to be 2.27 as against the record low of 2.03 for 1959. The figure for Richard Thomas & Baldwins' Panteg Works reached the record low figure of 0.47 for 1959—probably the lowest rate ever achieved in a steelworks. An article is devoted to this and the reason given is "a safety-conscious management and first-class foremen."

Mr. N. H. CHARLESWORTH, of Leeds Road, Wakefield, is retiring after completing 59 years' service with the firm of Bradley & Craven, Limited, brick-machinery manufacturers, Westgate Common, Wakefield. He has been head draughtsman for nearly 50 years and was appointed a director 20 years ago. He is a founder member and vice-president of the Wakefield Association of Engineers.

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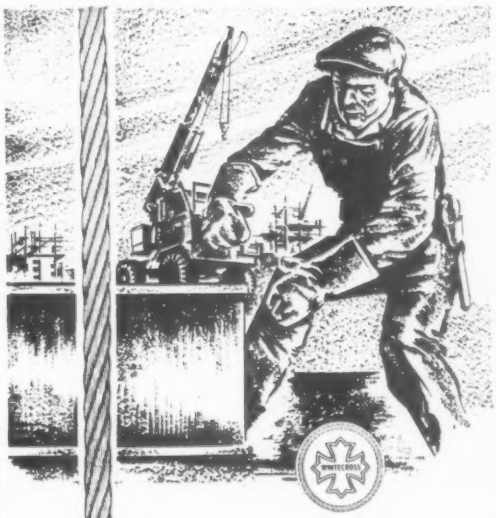

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Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisement Manager, Foundry Trade Journal, John Adam House 17/19, John Adam Street, Adelphi, London, W.C.2. If received by first post Monday advertisements can normally be accommodated in the following Thursday's issue.

SITUATIONS WANTED

FOUNDRY MANAGER / SUPERINTENDENT desires change. Mall, and grey, practical and technical. Take full control foundry. Rate fixing, etc. Wolverhampton area. Box FM740, FOUNDRY TRADE JOURNAL.

TECHNICAL REPRESENTATIVE (46) requires position with Iron and/or Steel Foundry. Connections in Lancashire and Yorkshire and N. England (grey and special cast irons, carbon and alloy steels.) Considerable technical, administrative and sales experience. Box TR732, FOUNDRY TRADE JOURNAL.

SHOTBLAST DESIGN ENGINEER seeks change. Age 39 with 18 years' experience designing all types of wheel and airblast plants. Qualified to take full charge from basic ideas to starting up plant. Representative (not sales) capacity preferred but not essential. Box SD746, FOUNDRY TRADE JOURNAL.

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FOREMAN required for Wood Pattern Shop in Manchester area. Applicant must be accustomed to a wide range of good quality equipment, keen, and able to maintain production schedule. Commencing salary £800 plus bonus. Reply to Box FR759, FOUNDRY TRADE JOURNAL.

TRAVELLER SALESMAN required for Southern England by leading Merchants handling all Foundry supplies and Foundry Machinery. Applicants, preferably with previous experience or especially with practical foundry knowledge, should apply to Box TS758, FOUNDRY TRADE JOURNAL.

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SITUATIONS VACANT—*contd.*

AN EXPANDING FIRM of Industrial Agents with Sale Staff covering a wide circle of contacts in the Engineering and Manufacturing Industries in South Midlands, London, Home Counties, and Southern Counties, are open to take further Agencies. Sound Principals producing Grey Iron Castings (high grade), Blackheart Malleable Castings, and Steel Forgings, requiring representation in these Areas are invited to contact Box AE757, FOUNDRY TRADE JOURNAL.

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SITUATIONS VACANT—*contd.*

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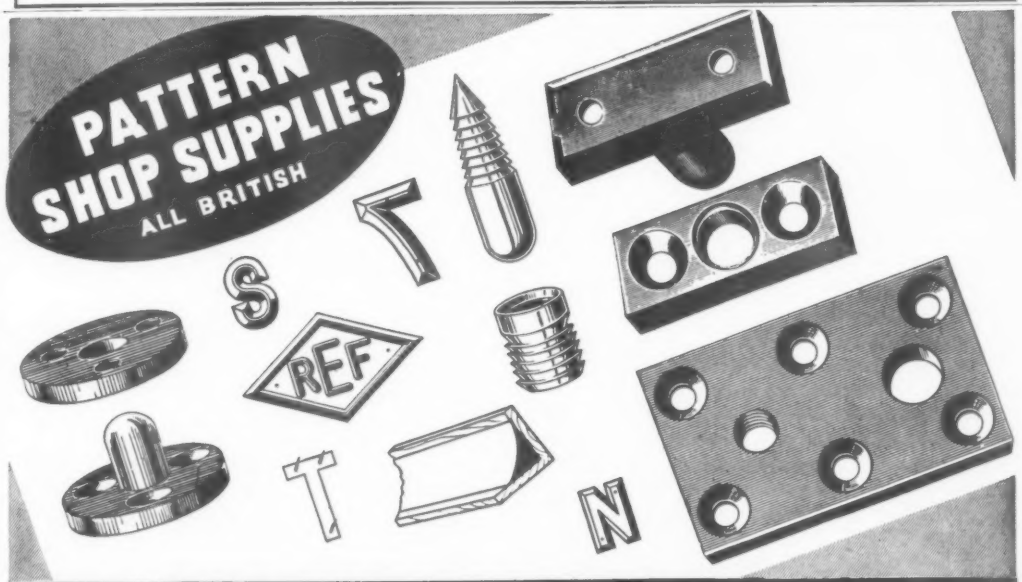

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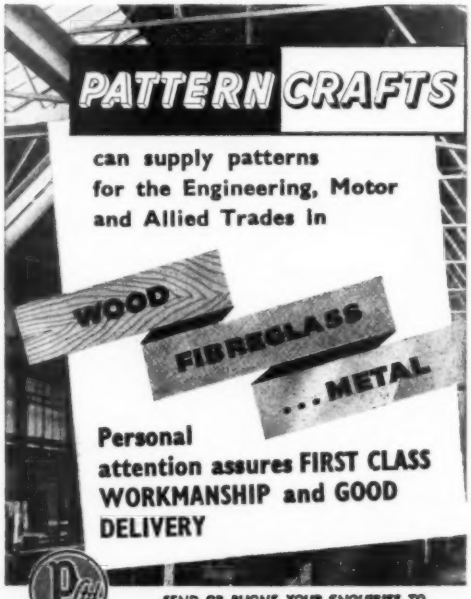
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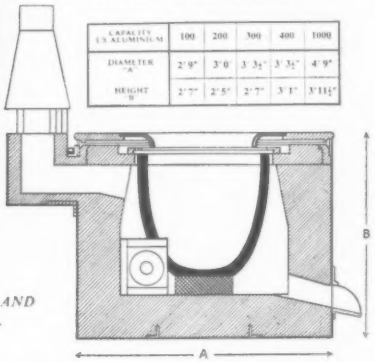

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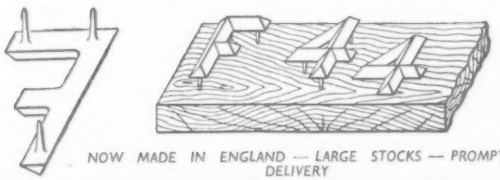

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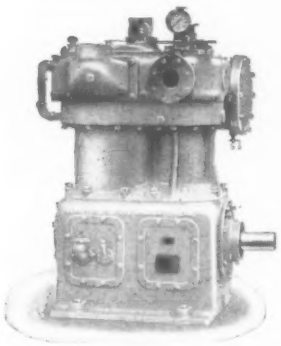

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